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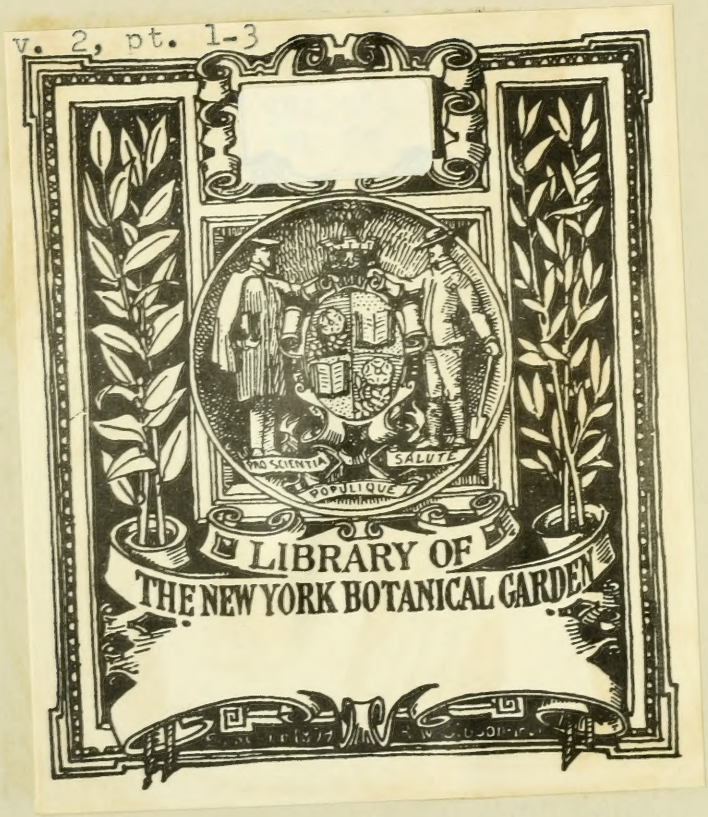
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THE NATURAL HISTORY OF JUAN FERNANDEZ AND EASTER ISLAND

EDITED BY DR. CARL SKOTTSBERG

VOL. II

BOTANY

WITH 116 PLATES

UPPSALA 1920–1953
ALMQVIST & WIKSELLS BOKTRYCKERI AB

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PART I

1. C. CHRISTENSEN & C. SKOTTSBERG: The Pteridophyta of the Juan Fernandez Islands.
2. C. CHRISTENSEN & C. SKOTTSBERG: The Ferns of Easter Island.
3. ROB. E. FRIES: Die Myxomyceten der Juan Fernandez-Inseln.

UPPSALA 1920
ALMQVIST & WIKSELLS BOKTRYCKERI-A.-B.

1. The Pteridophyta of the Juan Fernandez Islands.

By

CARL CHRISTENSEN and CARL SKOTTSBERG.

With 7 text figures and 5 plates.

This paper is based on material collected by the undersigned, assisted by Mrs. SKOTTSBERG, 1916—17. The study of the collection was begun in Santiago, where, thanks to the kindness of Mr. F. FUENTES, I had ample opportunity to see the important herbaria in the Museo Nacional and also, with the kind permission of Professor F. JOHOW, could study his herbarium in the Instituto Pedagójico. In order to solve some important questions and to classify some species which remained doubtful, I asked the prominent pteridologist, Dr. C. CHRISTENSEN, for assistance, and he willingly offered himself to make a thorough study of the entire collection. I have the great pleasure herewith to thank him for all the trouble he has taken in preparing the descriptions of the new species, in adding numerous critical notes on the systematic position and affinity and in making the fine and very exact drawings.

The localities in Masatierra are enumerated from E to W along the north and south sides of the island, respectively; for Masafuera, the localities are enumerated from N to S along the east coast and then round to the west coast, followed by the observations made in the high mountain region. The Spanish names are used, with the following abbrevations: B. = Bahía, bay; C. = Cordón, mountain ridge; Co = Cerro, mountain; Pta = Punta, cape; Pto = Puerto, cove; Q. = Quebrada, valley with steep sides, gorge, canyon; V. = Valle, valley. — Maps will accompany Vol. I.

Unless otherwise stated, all species have been observed by myself in all the places quoted. The numbers in brackets refer to our collection, of which specimens are kept in Stockholm (Riksmuseum), Gothenburg, Upsala etc., and in several foreign herbaria.

A ! after the name of a collector signifies that I have seen the original specimen.

An * before a latin name indicates a new addition to the flora of the group; if put before the name of one of the islands, it signifies that the species was found for the first time in the island in question.

The altitudes are in meters above sea level.

The remarks on fertility refer to my observations in 1908[1] and 1916—17; where I have reason to believe that a species occurs with ripe sporangia also at other seasons, these remarks are put in brackets.

We have adopted the nomenclature followed by CHRISTENSEN in his »Index Filicum», where also explanations of the abbreviated book titles will be found.

C. Skottsberg.

Hymenophyllaceae.

Trichomanes L.

1. **T. Philippianum** Sturm, Enum. pl. cr. vasc. chil. 38 (1858); v. d. Bosch, Syn. Hymen. ed. Goddijn, Meded. Rijk's Herb. Leiden no. 17: 24 f. 13 (1913); C. Chr. Ind. 647. — Syn. *T. dichotomum* Philippi Anal. Univ. 1856: 169, Bot. Zeit. 1856: 650, Ann. sc. nat. II. 7: 110; Hemsl. 69; Johow 1893: 44, 1896: 173; *non* Kze 1847.

Fig. 1.

Damp montane forests above 500 m., epiphytic on trunks of treeferns. (Fertile Jan.—April.)

Masatierra: the high ridge between Q.[2] Laura and Q. Piedra agujeriada, on *Dicksonia,* c. 650 m (no. 594); C. Centinela, on trunks of ferns, 580 m (no. 616); NE. slope of La Damajuana, on *Blechnum cycadifolium* c. 500 m (no. 351); C. Salsipuedes, Q. Helechos, on *Dicksonia,* 660 m (no. 283).

T. dichotomum Phil. was described from specimens collected by GERMAIN (!). No locality except »Juan Fernandez» was stated. In Herb. Kew is a specimen collected by REED (!) and labelled »Valdivia», probably in PHILIPPI's hand-writing (HEMSLEY, l. c.). It is possible that this locality is false: REED made extensive collections in both places and the localities may have been confounded. Until further investigations can be made, the species should be listed as endemic.

T. Philippianum is one of the most distinct species of the genus. It has been described and figured in details by VAN DEN BOSCH, but his description and figure were not published until lately by GODDIJN. The numerous specimens at hand correspond fairly well with this description, but the species grows much larger than his figure shows. The largest leaves are over 7 cm long including the 2 cm long stipe.

The filiform, wide-creeping rhizome and the basal part of the stipes are sparsely furnished with reddish hairs, the plant otherwise being perfectly glabrous. The leaves are either scattered or fasciculate in small tufts of 2—7 on short branches from the rhizome. The lamina is exceedingly thin, yellowish green, the cells larger than in any other species of the genus, clearly seen

[1] Botan. Ergebn. der Schwed. Exp. nach Patagonien und dem Feuerlande. IV. K. Svenska Vet.-Akad. Handl. Bd 51, No. 9 (1913).

[2] For abbreviations, see p. 1.

through a weak lens. In shape and division the leaf varies considerably; generally it is oblanceolate, broadening upwards from the cuneate, shortly decurrent base; subdeltoid, deeply pinnatifid fronds, leaving a broad even wing to the midrib are, however, not uncommon. Segments erect, 2—2,5 mm broad, obtuse or emarginate or deeply furcate at apex, very unequal in length, the larger ones often producing a secondary segment on the upper side near the base. Margins even, not at all thickened. Veins not regularly pinnatifid but rather repetitiously dichotomous, not atrofuscous as says BOSCH, terminating in the emargination; spurious veins none. Sori rarely terminal on the main branches

Fig. 1. *Trichomanes Philippianum* Sturm. Plants showing different types of furcation, nat size, and enlarged sorus.

of the veins but generally confined to the basal secondary segments, deeply immersed; indusium turbinate with a widened entire mouth; receptacle long exserted but easily broken off.

VAN DEN BOSCH placed the species in his genus *Gonocormis,* but it may be seriously doubted whether this position is natural. It looks very much different from all other species of that group, all of which belong to the Old World. In general habit and size it resembles the Polynesian *T. humile* Forst., but it is certainly not nearly related to it. By its cellular structure it is quite unique.

Area of distribution: Probably endemic in Masatierra.

2. **T. Ingae** C. Chr. nov. spec.

Syn. *T. pyxidiferum* L., Hemsl. 69; Johow 1893: 45, 1896: 173.

Eutrichomanes e grege *T. pyxidiferi* L., rhizomate intricato, filiformi;

foliis atroviridibus, planis, glabris, lanceolatis, maximis vix 5 cm longis et 1 cm latis, stipite 1—1,5 cm longo, e medio sursum anguste alato, rhachide tota alis sub 0,5 mm latis utrinque alata. Lamina bipinnatifida, pinnis 5—6-jugis, alternis, suberectis, infimis paulo abbreviatis, mediis 5—8 mm longis, inaequilateralibus, basi superiore segmentum soriferum gerentibus, parte exteriore in 2—4 segmenta sterilia contigua subtruncata vel leviter emarginata divisis. Marginibus, praesertim versus apicem, minutissime et irregulariter crenato-dentatis. Venis distinctis, spuriis nullis. Cellulis parenchymaticis parvis, irregularibus, 4—6-angulatis, fere isodiametricis parietibus crassis, hyalinis. Soris singulis axillaribus, rarissime binis in pinna, tubo cylindrico anguste marginato, ore integro vel levissime emarginato, paulo expanso; receptaculo exserto.

Fig. 2.

In moss mats on stones and on the ground, in dense forests, rare. (Fertile Aug.—Dec.)

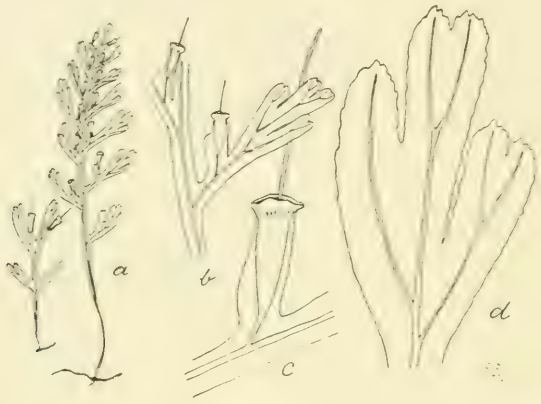

Fig. 2. *Trichomanes Ingae* C. Chr. *a* two fronds, nat. size; *b* fragment, × 2½, *c* sorus and *d* tip of sterile pinna, more enlarged.

Masatierra, central part: V. Anson, NE. slope of El Yunque, 300 m (no. 162), in the same place where it was found in 1908; NE. slope of La Damajuana, c. 450 m; V. Colonial, Q Gutierrez (no. 68). — Found before only by MOSELEY and by SKOTTSBERG, 1908.

This new species, named in honour of Mrs. INGA SKOTTSBERG, belongs to a number of closely related species which by most authors are united under the name *T. pyxidiferum* L. Convinced of this being a collective species that includes several valid ones, a number of which have already been described by VAN DEN BOSCH, we have tried, but without success, to identify the Juan Fernandez form with one or other of the forms from the American continent. Our new species differs greatly from the true West Indian *T. pyxidiferum* by its much less divided lamina and by its dark colour; in these characters it approaches some South Brazilian forms, especially *T. emarginatum* Pr., but it differs from these as well as from all other forms known to us by its cellular structure and its uneven margins. The cells are proportionally very small, very unequal in size and seldom longer than broad; by this structure the leaf becomes much firmer than in all other forms without spurious veins. Seen

through a strong lens, the margins of the outer parts of the segments are irregularly toothed or crenate by outwards vaulted marginal cells, the external wall being thick and hyaline. A similar feature was not found in a large number of specimens of *T. pyxidiferum* sens. lat. examined. The numerous specimens collected have all the same characteristic habit, with the outer segments of the pinnae very close. The diagnosis above was based on the larger fronds; most of them are considerably smaller.

Area of distribution: Endemic in Masatierra.

3. **T. exsectum** Kunze, Anal. 47 tab, 29 f. 2 (1837); Hemsl. 69; Johow 1893: 44 f. 32, 1896: 173. — Syn. *Hymenophyllum fuciforme* Colla 1836: 33 tab. 63.

In dense humid forests, epiphytic on trees and trunks of arboreous ferns, and in damp recesses of the narrow gorges, among moss, hanging down from the rocks. (Fertile Jan.—April.)

Masatierra: C. Chifladores, above the innermost part of the Frances Valley, c. 500 m; ridge between Q. Laura and Q. Piedra agujeriada, on *Dicksonia* 650 m (no. 595); C. Centinela, on fern trees 560 m; El Pangal, wet forest in the gorge (no. 1130); B. Cumberland, in Cave VI, forming a beautiful pure carpet on the vertical walls (no. 598; also JOHOW); Q. Juanango, under fallen trunks (no. 608); Q. Villagra, mountain spur W. of El Yunque, c. 500 m.

Masafuera: Q. del Mono, c. 475 m; Q. de las Casas, under overhanging rocks in the canyon (no. 450, also JOHOW); Q. del Blindado, 440 m; Q. de las Vacas (JOHOW).

The nearest ally of this pretty species, that reaches 40 cm in length, is *T. tenerum* Spr., widely spread through tropical America.

Area of distribution: South Chile, Valdivia to Chiloé; Juan Fernandez.

Serpyllopsis v. d. Bosch

4. **S. caespitosa** (Gaud.) C. Chr. Arkiv för Bot. 10: 29 c. fig. (1910). — Syn. *Hymenophyllum caespitosum* Gaud. Ann. sc. nat. 5: 99 (1825); Freyc. Voy. Bot. 374 tab. 5 f. 2 (mala); *Trichomanes caespitosum* Hook. Sp. Fil. 1: 132 tab. 40 B; C. Chr. Ind. 637; *Serpyllopsis antarctica* v. d. Bosch Ned. Kr. Arch. 4: 377 (1859).

Var. **fernandeziana** C. Chr. et Skottsb. nov. var.

This interesting moss-like fern was first detected in the islands by SKOTTSBERG, 1908. In 1910 C. CHRISTENSEN referred the specimens of the 1908 collection to var. *densifolia* (Phil.) C. Chr. l. c. 30 (*Hym. densifolium* Phil. Linn. 29: 108, 1857), which was collected in the Guaitecas Islands and presumably is not rare in the humid forests of the Chilean Archipelago. The specimens from Juan Fernandez were sterile; now we have a beautiful lot of specimens, some of which are fertile, and an examination of the sori has proved that we

have to do with a form different from *densifolia*. It may be described as follows.

Lamina luteo-viridis, pinnis plerumque ovatis secus costam parcissime pilosis, ut in var *densifolia;* differt soris profunde immersis utrinque late foliaceo-alatis, fere ad medium bipartitis, labiis rotundatis, distincte dentatis, extus 2—4 cristis longitudinalibus dentatis instructis, receptaculo ad maturitatem exserto.

In the moss carpets on trunks and branches of trees, in the elevated forests of Masatierra, where it has not been found below 450 m; on Masafuera also in the heath of the highland, among rocks. (Fertile in Jan.)

Masatierra: C. Chifladores, in the innermost part of the Frances valley, on *Drimys Winteri* c. 500 m (no. 1128); ridge between Q. Laura and Q. Piedra agujeriada c. 650 m (no. 1129); on the main crest of the island, above Pangal, on *Drimys* c. 800 m (no. 1127); V. Colonial, along the road to Portezuelo, on *Drimys* c. 450 m (no. 136); C. Salsipuedes, brushwood on the ridge, 615 m, and in Q. Helechos, on *Drimys*, 660 m (no. 284).

Masafuera: Heath above Q. del Mono, c. 850 m (no. 421); rocks at Las Torres, 1350—1370 m (no. 421 b—see below); S. slope of Los Inocentes, in *Dicksonia*-forest on the trunks, c. 950 m; also near the highest summit, 1450 m in moss mats (no. 381); Q. Lobería, between blocks in the stream.

Var. *densifolia* has 1—8 sori terminal on the pinnae, the lips obscurely toothed and faintly crested, the wings on both sides much narrower. The typical form of the species, from the Falkland Islands, has terminal sori with very short lips; it turns brown when dried and is much more hairy, with more oblong pinnae. Var. *fernandeziana* is generally small with only 2—5 pairs of pinnae which are close, often imbricated and clasped along the midrib. There is, however, also a form with more distant and more oblong pinnae (no. 421 b), a form corresponding to var. *elongata* Hook. of the type; the special characters are due to external conditions (moisture and shade).

Area of distribution: South Chile to Fuegia, Falkland Islands; the var. *fernandeziana* endemic in Juan Fernandez.

Hymenoglossum Presl

5. **H. cruentum** (Cav.) Pr., Hymenoph. 35 (1843); v. d. Bosch, Ned. Kr. Arch. 4: 385. — Syn. *Hymenophyllum cruentum* Cav. Descr. 275 (1802) et auctt., Hemsl. 67; Johow 1893: 40 f. 26, 1896: 169; C. Chr. Ind. 359.

Plate 1 Fig. 1.

In the montane forest belt, with moss on the soil or on trunks of trees, scarce. (Fertile Dec.—Jan.)

Masatierra, not rare in the central parts: V. Anson, NE. slope of La Damajuana c. 430 m (no. 353); slopes of El Yunque, 480 m; V. Colonial, C. Central 535 m; along the road to Portezuelo, c. 500 m (no. 67); north wall of Co Pirámide, a narrow ledge 600 m; Q. Villagra, mountain spur W. of El Yunque, c. 500 m and SW. face of Co Pirámide, among brushwood, 590 m.

*Masafuera: Q. de las Casas, humid moss mats in the inner canyon, scarce (no. 473); C. del Barril, in moss on rocks, c. 750 m (no. 407). — New for this island. The specimens are small and sterile.

In restoring the genus *Hymenoglossum* we follow VAN DEN BOSCH, the monographer of the family, contrary to all other pteridologists. Our reasons for doing so are not only the unique habit of the plant, but are based upon a very essential character, overlooked by PRESL and all later authors. The margins of the frond, not the sterile parts alone, but also the valves of the indusium, are bordered by a thick ebeneous line. The veins terminate in the parenchyma within this line.

Area of distribution: South Chile, Valdivia to Chiloé and Western Patagonia to 49°; Juan Fernandez.

Hymenophyllum Sm.

6. **H. cuneatum** Kze, Anal. 50 (1837); C. Chr. Ind. 359, Arkiv för Bot. 10: 21 (1910). — Syn. *H. rarum* auctt. quoad plant. amer.; Hemsl. 68; Johow 1893: 42 f. 30, 1896: 171. *H. polyanthos* auctt. quoad plant. fernand.; Hemsl. 67; Johow 1893: 42 (pro pa te? non f. 29), 1896: 172 (pro parte?). *H. dichotomum*, Johow 1893: 44 (pro parte?) f. 27, 1896: 173 (pro parte?).

Fig. 3.

Probably fertile at any time of the year.

Under this name whe unite all the smaller glabrous Hymenophylla of the islands, being convinced that they all belong to one species, although the extreme forms look very different. All forms agree in cellular structure and in shape of the indusium, which is broad, flat with a broad subtruncate or broadly cuneate base and with rounded or sometimes subacute valves. The indusium varies, as our figures show, in the same degree in the largest and smallest forms.

KUNZE described the stipe as unwinged. We find among the very extensive material several individuals which correspond perfectly to his description (no. 396); they have ovate or subdeltoid, middle-sized, yellowish-green fronds with wingless stipe and broad, semiorbicular indusia. Other plants agree with these in all respects but have the stipe winged to the base (no. 1145). We suppose that these are younger plants, while fronds without wings are older, having lost the wings. Large or small fronds occur with or without a winged stipe. If no. 396 is considered to be a typical, middle-sized form, the other specimens may be arranged as follows.

1) Large plants, over 15 cm long incl. stipes, more decompound, with narrower, ovate-lanceolate lamina, often of a deeper green (no. 285). Such plants have been referred to *H. polyanthos* Sw. by all authors, and probably also the more typical form was brought to this species by some. It is very difficult to find a single constant character by which the larger forms may be known from the variable *H. polyanthos;* the lobes are generally broader, the

valves of the indusium more rounded and flat, but certain forms of *H. polyanthos* show essentially the same characters. The best mark is, perhaps, the glabrous base of the stipes in *H. cuneatum*, while most forms of *H. polyanthos* have the stipes pilose below.

2) Smaller plants, often much reduced and approaching *H. rarum* R. Br. (nos. 146, 1143), and referred to that species by all authors. The leaves are yellowish green, 1—3 cm long, the pinnae often more or less imbricate (no. 146). It must be admitted that some of these dwarf forms closely resemble *H. rarum* in most characters, but we find leaves with and without a winged stipe which otherwise are identical, and *H. rarum* has the stipe unwinged; further, all possible transitions between these dwarf forms and the larger ones are found. None of the specimens show the brownish colour of the typical *H. rarum*.

Summarizing what has been said above, we find it convenient to distinguish two types.

1. **typicum.** (*H. cuneatum* Kze, *H. polyanthos* auctt.) — Fig. 3 a—d.

One of the commonest ferns, found in all the forests in moss carpets on the soil, on stones or on trunks of trees, in the eastern and central parts of Masatierra, where it ranges from about 200 m above sea level to the highest parts reached, viz. the main ridge above Pangal, 795 m. It is also common among the brushwood on the rocky ridges and, of course, on *Dicksonia*. — Probably fertile at all seasons (Dec.—April, Aug.).

Masatierra: numerous localities from Pto Frances to Pto Ingles (nos. 46, 66, 70, 285, 300, 591, 1144, 1177; nos. 66 c and 70 form a transition to the following; both collected on rocks).

Masafuera: Q. del Mono, in forest 570 m (no. 1146); Q. del Bindado in forest (no. 440); subalpine and alpine heath, 850—1370 m (nos. 396, 429, 1146, 1147); Q. Lobería, in moss on boulders in the woods, c. 300 m (no. 1145).

2. var. **rariforme** C. Chr. et Skottsb. — Fig. 3 e—g.

This is exactly the *H. rarum* of JOHOW (!), often found on old trunks of *Blechnum cycadifolium*, but also forming dense, almost moss-like patches on exposed ground. Leaves often 1 cm long only, generally deltoid in outline.

Masatierra: At the road to Portezuelo, c. 450 m (no. 1143); on the sharp crest separating V. Anson from Q. Damajuana, on the peak, 365 m (no. 146). — f. *imbricata;* Fig. 3 h: Pto Ingles, the crest of the central ridge (no. 1178).

Area of distribution: South Chile, Valdivia to Western Patagonia; Juan Fernandez. Tasmania? New Zealand? South Africa?

7. **H. caudiculatum** Mart. Ic. Crypt. Bras. 102 tab. 67 (1834); Johow 1893: 41, 1896: 170; C. Chr. Arkiv för Bot. 10: 23 (1910).

In the the elevated forests of the foggy region of Masatierra, very rare; apparently more frequent in Masafuera, found both in the woods and in the bottom of the deepest canyons. — (Fertile Dec.—Febr.)

Masatierra: Just below the gap between El Yunque and La Damajuana, c. 500 m (no. 160); North face of Co Pirámide, narrow ledge, c.

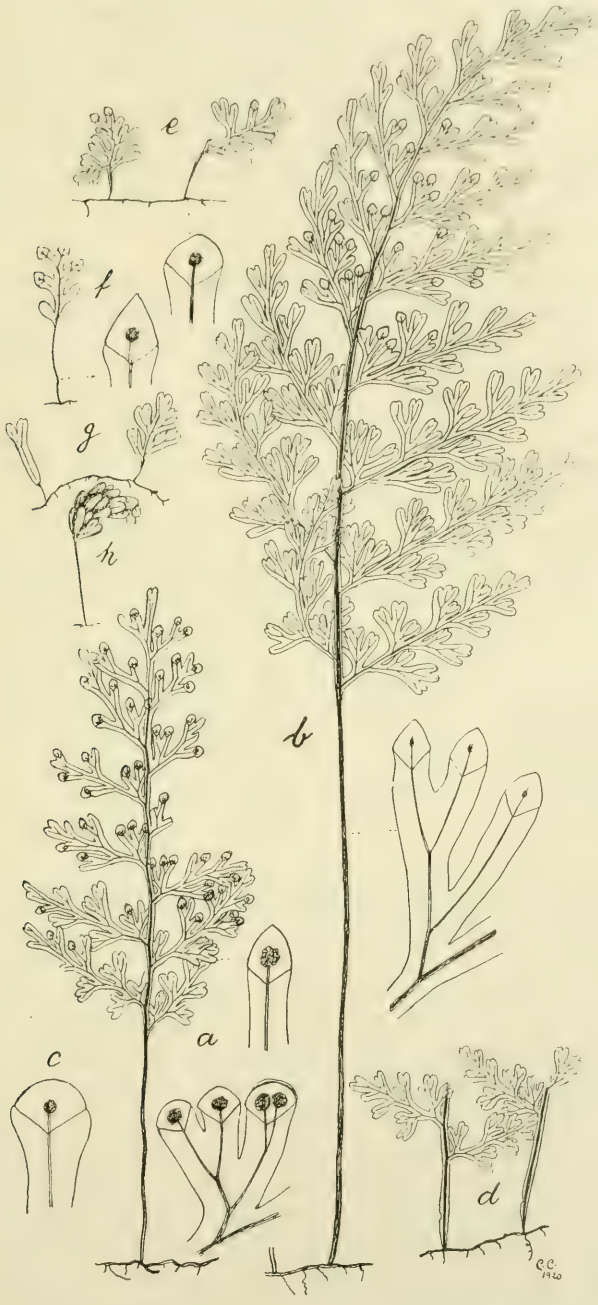

Fig. 3. *Hymenophyllum cuneatum* (Cav.) Pr. *a* typical *cuneatum* (no. 396), with enlarged sori, indusium acute or rounded; in one are two sori; *b* large *polyanthos*-like frond with enlarged tip, showing acute indusia (no. 285); *c* blunt sorus from a plant like the former (no. 66); *d polyanthos*-like frond with winged stipe (no. 1145); *e—f rariforme* with stipe and indusiam of different types (no. 1143); *g* small *rariforme* (no. 146); *h* f. *imbricata* (no. 1178).
All plants nat. size.

600 m (no. 360). — Only collected once before in Masatierra: REED(!) without locality.

*Masafuera: Q. del Mono, dense forest, 475 m (no. 388); Q. de las Chozas, in the forest; Q. de las Casas, innermost part of the canyon, under stones below the cascade, 215 m (no. 465); Q. Lobería, under stones and in moss between huge blocks, 180—300 m (no. 481). — New for Masafuera, where fine, richly fertile specimens were collected in Q. de las Casas.

The specimens belong to the typical form.

Area of distribution: South Chile, Valdivia to Western Patagonia (49° S. L.); Juan Fernandez. South Brazil.

8. **H. fuciforme** Sw. Syn. 148 (1806) et auctt.; C. Chr. Ind. 361 (where for »China austr.» read »Chile austr.»); Hemsl. 67; Johow 1893: 41, f. 28, 1896: 170; C. Chr. Arkiv för Bot. 10: 24 (1910). — Syn. *H. semiteres* Colla 1836: 32, tab. 61.

Humid montane forests in rich soil or on decaying trunks, not observed below 480 m. (Fertile Dec.—Jan.)

Masatierra: Slope of C. Chifladores, above the Frances valley, c. 500 m; V. Anson, slopes of El Yunque, 480 m; near the road to Portezuelo, c. 500 m (no. 138); north face of Co Pirámide, with the preceding; Q. Villagra, mountain spur W. of El Yunque, c. 500 m and at the road-side in the highest part of the Villagra valley below the pass, c. 500 m (also JOHOW).

This species, the largest of the genus, varies in cutting from tri- to quadripinnatifid. The less divided form is not, as we supposed in 1910, the only one found in the island. Specimens in the present collection are quite as much divided as specimens from Chile.

Area of distribution: South Chile to Western Patagonia; Masatierra.

9. **H. ferrugineum** Colla 1836: 30; C. Chr. Ind. 361. — Syn. *H. subtilissimum* Kze. Anal. 49 (1837); Hemsl. 68; Johow 1893: 43 f. 31. 1896: 172; *H. Berteroi* Hook. Sp. fil. 1: 93 tab. 33 C (1844); Gay 6: 534.

Damp, shady forests of the highest mountain slopes, not found below 480 m; characteristic of the darkest corners in the fern groves. (Fertile in Jan.)

Masatierra: C. Chifladores, woods in the highest part of the Frances valley, on *Dicksonia* c. 500 m; the ridge between Q. Laura and Q. Piedra agujeriada, c. 600 m and high up in this valley, 650 m; C. Centinela, under old stumps, 530—560 m; V. Anson, slopes of El Yunque, 480 m (no. 159, also P. ARREDONDO in Herb. JOHOW!); V. Colonial, north face of Co Pirámide, with the preceding; C. Salsiquedes, Q. Helechos, on *Dicksonia* 660 m (no. 76); Q. Villagra, high up near the pass, rare.

*Masafuera: Q. de las Chozas, dark fern grove under *Dicksonia*, c. 700 m (no. 535). — New for this island.

With this characteristic species most authors unite *H. Frankliniae* Colenso from New Zealand, to which it is so closely related that it is not unnatural to

unite them into one species. Specimens from Chile are scarcely to be distinguished from others from New Zealand, often having distant pinnae, the lower ones being much abbreviated. All specimens from Juan Fernandez, the type locality, have closer segments and an ovate lanceolate lamina, with the lower pinnae not or very slightly shortened. *H. acruginosum* (Thouars) Carm. from Tristan d'Acunha is another near relative, but much smaller than either (see Hemsl. Chall. Rep. Bot. I. 2, tab. 38). A fourth related form grows in the caves of Amsterdam Island in the Southern Indian Ocean. It was, we believe without sufficient reason, referred to *H. obtusum* Hook. et Arn. by HEMSLEY (l. c. 271), a Hawaiian species; more properly it might be reduced to *H. acruginosum* as a variety.

It is an interesting fact that four so closely related forms are scattered in remote localities over such a large area of the Southern Hemisphere. They are, we should guess, daughter forms of a single species that in old times was widely dispersed over the Antarctic continent. It must not be forgotten, however, that some of the forms may be derivates of the common tropical *H. ciliatum*.

Area of distribution: South Chile, Valdivia to Fuegia; Juan Fernandez. New Zealand.

*10. **H. falklandicum** Baker, Syn. fil. 68 (1867); C. Chr. Arkiv för Bot. 10: 25 f. 3 (1910).

Fig. 4 g—h.

A new addition to the flora, growing both in the moss carpets of the forest floor and on trees, as well as in the alpine heath. (Fertile Feb.—March.)

Masafuera: Q. del Mono, in forest, 570 m (no. 389); Q. del Blindado, in forest, 440 m (no. 398); Q. de las Casas, far into the canyon, with Hepatics, c. 200 m (no. 474); alpine heath near the Correspondencia Camp and at Las Torres, 1100—1370 m (nos. 1142, 1176).

Widely distributed through Subantarctic America and very likely not different from *H. Menziesii* Pr. Hym. 51 from Staaten Island. Still PRESL described his species as having obovate, subglobose, pedicellate sori, while *H. falklandicum* has ovate-lanceolate valves of the indusium.

The specimens from Masafuera are, as could be expected, larger than those from the heaths of Fuegia and the Falkland Islands and also of a more vivid colour, but in essential characters they do not differ. The largest fronds measure nearly 10 cm in length and are of the narrow lanceolate shape shown in fig. 3 a—b quoted above. The distinctly unilateral pinnae bear from 1 to 4 toothed segments on the upper side. The sori are single, or, in larger fronds 2 to each pinna, distinctly stipitate, with ovate-lanceolate, obtuse and quite entire valves, which turn blackish brown with age. By its narrow lanceolate fronds and especially by the long dark brown valves very different from all forms of *H. peltatum*.

A specimen of the 1908 collection from Masafuera was l. c. referred to *H. peltatum*. This is incorrect; probably the bad specimen should be referred to the next species rather than to *H. falklandicum*.

Area of distribution: Southern West Patagonia, Fuegia, Falkland Islands; South Georgia; Masafuera.

*11. **H. rugosum** C. Chr. et Skottsb. nov. spec.

Syn. *H. tunbridgense* of Gay and Phil.? Hemsl. 69; Johow 1893: 44, 1896: 172.
Fig. 4 *a—f*.

Leptocionium rhizomate filiformi, longe repente; foliis remotis, stipitibus erectis, filiformibus, glabris, omnino exalatis, saepe flexuosis, 3—4 cm longis.

Fig. 4. *a—f Hymenophyllum rugosum* C. Chr. et Skottsb. *a* well developed frond (no. 630); *b* leaf recalling *H. tunbridgense* (no. 423); *c* f. *lanceolata* (no. 1175); *d* fragment of a, × 4; *e* sorus, × 10; *f pinna* of c, × 4; *g—h H. falklandicum* Bak.; *g* two pinnae (no. 389), × 4; *h* sorus, × 10. All entire fronds in nat. size.

Lamina formae typicae ovato-deltoidea vel ovato-lanceolata, 5—6 cm longa, 3—4 cm lata, brunnescente, perfecte plana, saepe curvata, subtus papillis brevissimis ad rachidem venasque rugosa, tripinnatifida; rhachide flexuosa, alata, alis denticulatis. Pinnis alternis, circ. 10-jugis, infimis plus minusve abbreviatis vel subaequalibus, aequaliter pinnatifidis vel basi inferiore paulo excisis, supremis minoribus distinctius inaequilateralibus. Pinnulis obliquis, inaequilateralibus, in segmenta 3—4 divisis, marginibus ubique acute denticulatis. Venis distinctissimis, nigriscentibus. Soris 1—8 pro pinna, praesertim in segmentis lateris superioris pinnarum insidentibus. Indusiis liberis nec immersis nec stipitatis,

fere ad basin in valvas duas ovato-elongatas, brunneas vel nigrescentes, apice distincte et acute dentatas divisis; receptaculo incluso.

In the higher woods and humid heaths of the highlands, apparently not very rare. (Fertile Feb.—April.)

Masatierra: Elevated slopes of Q. Piedra agujeriada, on fern-trees, 650 m (no. 592); C. Centinela, dark humid forests, c. 560 m (no. 1140); the longitud. ridge, above Pangal, on fern trees, c. 800 m; Q. Villagra, mountain spur W. of El Yunque, c. 500 m (no. 630).

Masafuera: Woods on the Sanchez plain, 515 m (no. 1137); heath of the Correspondencia Camp, in the ravines, 1100—1200 m (nos. 423, 1139); C. del Barril, c. 750 m; Q. del Blindado, in the forest, on ferns, 440 m (no. 397); near the summit of Los Inocentes, c. 1400 m (no. 1138).

f. *lanceolata:* minor, lamina lanceolata, 3—5 cm longa, raro supra 1 cm lata, alis rachidis vix denticulatis; habitu, magnitudine et pinnis omnibus inaequilateralibus *H. falklandico* sat similis, sed differt et cum f. typica congruit soris non stipitatis nec non valvis distincte denticulatis. — Fig. 4 *c*.

Masafuera, at the Correspondencia Camp, in the ravine, with the type, 1160 m (no. 1175).

This new species is to *H. tunbridgense* what *H. falklandicum* is to *H. peltatum*. It is very variable in size and shape of the lamina, but all forms have the same characteristic brown or dark brown indusia with elongated, toothed valves, similar in outline to those of *H. falklandicum*, but never stipitate and always dentate (comp. Fig. *e* and *h*). The larger, ovate-deltoid fronds recall *H. dichotomum,* but they are quite plane and the stipe is wingless; the sori are very different, the mature sporangia never exserted. Middle-sized leaves with short, ovate-oblong lamina with all pinnae unequal-sided (Fig. *b*) can scarcely be distinguished from *H tunbridgense* when sterile, but leaves with mature sori at once show the difference; true *H. tunbridgense* never has so elongated valves, which never are brown. There is little doubt of such forms having been referred to *H. tunbridgense,* a species scarcely occurring in the islands. The f. *lanceolata* is very similar to *H. falklandicum* in general habit, but is easily known by its sessile indusia and toothed valves. The collection contains many intermediate forms between the extremes.

Area of distribution: Endemic.

12. **H. pectinatum** Cav. Descr. 275 (1802); Johow 1893: 42, 1896: 170. (Fertile, March.)

Masatierra: REED (!Herb. Kew) without exact locality.

***Masafuera:** In the highest part of the island, under rocks etc. in the alpine heath; the Correspondencia Camp, in the ravine, 1160 m (no. 1141); Las Torres, in wet moss under rocks, rare, 1370 m (no. 476); S. slope of Los Inocentes, in a fern grove, 950 m, on *Dicksonia,* and in the heath near the summit, c. 1400 m (no. 378). — New for this island.

The specimens are very poorly fructiferous; the largest ones have most of the secondary segments deeply cleft, thus somewhat resembling *H. secundum.*

Area of distribution: South Chile, Valdivia to Fuegia; Juan Fernandez.

*13. **H. secundum** Hook et Grev. Ic. Fil. tab. 133 (1829); C. Chr. Ind. 367.

(Poorly fertile, Feb.)

Masafuera: Las Torres, edge of the western precipice, 1370 m (no. 475).

New to the islands. The specimens are small but otherwise typical. By the entire valves of the indusium surely to be distinguished from *H. rugosum*.

Area of distribution: South Chile, Valdivia to Fuegia; Masafuera.

14. **H. dichotomum** Cav. Descr. 276 (1802); Hook. Sp. Fil. 1: 98 tab. 36 A et auctt.; Hemsl. 67; Johow 1893: 40 (pro parte?, certe non f. 27), 1896: 169 (pro parte); C. Chr. Arkiv för Bot. 10: 27 (1910). — Syn. *H. nigricans* Colla 1836: 32 tab. 62. *H. polyanthos* Johow 1893: 42 (pro parte?) f. 29, 1896; 171 (pro parte?)

Probably fertile at almost any season. One of the commonest species, found on the low, dry slopes of western Masatierra as well as in the central and eastern parts, where it is frequently met with in the wooded region from its lower limit to the highest ridges; also common in Masafuera. It grows on the soil, on stones or on trees, both fallen and living ones.

Masatierra: eastern and central parts, common (nos. 45, 218, 571, 593, 1133, 1134); the dry western part: ridge SW of Co Tres Puntas, 300 – 350 m, under stones (no. 1132), and in the bottom of dried-up ravines (no. 1132 b).

Masafuera: Q. del Mono, on trees, 475 m (no. 390); Q. de las Casas, in the canyon (no. 451); Q. del Blindado, common in the forest 440 m; *Dicksonia*-grove on the lower slope of Los Inocentes, above Q. del Varadero, c. 950 m; Q. Lobería, between blocks in the streem, 180 m (no. 480).

This common species varies considerably in size and shape of the frond, measuring from 2—3 to 20 cm in length, in shape broadly ovate to lanceolate, but all forms have the very characteristic plicate frond of a dark green colour. Young leaves have distinct brown, crisped wings along the stipe, much narrower, however, than those of *H. tortuosum;* these wings are shed early so that older leaves have an unwinged stipe. The marginal teeth are much shorter than in *H. tortuosum*. The sori are confined to the upper third of the frond (which is often more or less contracted), where they are numerous. The ovate-subacute, frequently apiculate valves of the indusium are entire and faintly or not at all spinose on their back, as described and figured by HOOKER. The large brown sporangia are exserted in the mature sorus. The smaller forms have the leaves very much contorted and look peculiar when compared with the larger ones.

We think that *H. nigricans* Colla is this species; at least BERTERO's specimens in Herb. Kew (!) under this name clearly belong here and not to *H. tortuosum* to which GAY referred COLLA's species.

Evidently this species has been largely confounded with others. It is perhaps the most common of the genus in the islands, but, nevertheless, JOHOW only quotes other collectors and not himself, this because he misunderstood the species, for his fig. 29, 1893, is not »H. polyanthos», but *H. dichotomum,*

while, on the other hand, his fig. 27 »H. dichotomum» illustrates a form of *H. cuneatum*.

Area of distribution: South Chile, Valdivia to Western Patagonia; Juan Fernandez.

15. **H. tortuosum** Hook. et Grev. Ic. Fil. tab. 129 (1829); Hemsl. 69; Johow 1893: 43, 1896: 172.

Apparently rare, but easily confounded with the former. (Fertile Feb.)

Masatierra: REED(!) in Herb. Kew.

***Masafuera:** Q. del Blindado, in woods, 440 m (no. 1136); heath at the upper course of Q. del Mono, c. 850 m (no. 1135). — New for this island.

To this species we refer two sets of specimens from Masafuera. They differ from the common *H. dichotomum* in the rather persistent, broad, crisp, brown wings of the stipe, the non-plicate lamina, which is more or less undulate with much larger marginal teeth. The segments are closer and the larger pinnae have the pendent tips found in most specimens from the continent. The valves of the indusium are rather acute and nearly entire, thus approaching *H. dichotomum*.

H. tortuosum was also collected in Masatierra by PHILIPPI and DOWNTON, t. HEMSLEY. We have not seen the former; the latter (Herb. Kew!) belongs to *dichotomum*.

Area of distribution: South Chile, Valdivia to Fuegia, Falkland Islands; Juan Fernandez.

[*H. reniforme* Hook. is mentioned by PHILIPPI (Anal. Univ. 1856: 160, Bot. Zeit. 1856: 631) who undoubtedly based his statement on GAY 6: 535. It has not been found by any of the known collectors, and GAY does not tell where he got his information as to its occurrence in Juan Fernandez. As far as we know there are no specimens in any herbarium from this place, so that it must be excluded from the list.

H. dicranotrichum (Pr.) Sadeb. (Syn. *H. chiloense* Hook,). is listed by JOHOW 1893: 44 and 1896: 172, as gathered by REED in Masatierra. The determination is probably incorrect.

In Herb. Kew.(!) are specimens of *H. dentatum* Cav. (Syn. *H. Bridgesii* Hook.) labelled (by PHILIPPI) Juan Fernandez oct. 1872 REED. As no author lists this species, the locality remains doubtful.]

Cyatheaceae.

Thyrsopteris Kunze

16. **T. elegans** Kze Linnaea 9: 507 (1834), Farrnkr. tab. 1, et auctt.; Hemsl. 66; Johow 1893: 22 f. 4, 1896: 155. — Syn. *Panicularia Berteri* Colla 1836: 35 tab. 64.

Characteristic of the upper montane forests in Masatierra, generally not descending below 400 m; belonging to the highland heath in Masafuera, where

it is rather poorly developed. The fertile pinnae are developed during the summer; in the beginning of December we collected fronds with very young sori and still in the end of January no ripe ones were observed; in the later half of March the sporangia were ripe and the spores disseminated.

Masatierra, not rare in the central part: C. Centinela c. 530 m; V. Anson, slopes of El Yunque, 480 m; C. Central, c. 500 m; along the road to Portezuelo in several places (lowest station observed 208 m, at a small stream), especially near the pass, c. 500 m (no. 14); C. Salsipuedes, open brushwood on the narrow ridge, 615, 625 m; Q. Salsipuedes, light woods, c. 500 m, numerous; Q. Helechos, not rare in *Dicksonia*-groves; Pto Ingles, on the central ridge, 470 m; Q. Villagra, frequent in the humid woods below the pass (no. 277), but also seen on a low ridge just below the lower limit of trees, c. 200 m.

Masafuera: Q. de las Casas (JOHOW); subalpine heath, in the shallow fern-clad beds of the streams, not rare from the Sanchez plain to the Correspondencia ravine, 1000—1100 m (no. 542); C. del Barril, 900—1000 m, not rare; on the ridge forming the south wall of Q. de las Vacas, not rare above 1000 m, *Dicksonia*-groves on the lower S. slope of Los Inocentes, etc. etc.

The specimens from the two islands are fully identical.

Area of distribution: Endemic.

Lophosoria Presl

17. **L. quadripinnata** (Gmel.) C. Chr. — Syn. *Alsophila quadripinnata* (Gmel.) C. Chr. Ind. 47 cum syn.; *A. pruinata* (Sw.) Klf. et auctt.; Hemsl. 66; Johow 1893: 20 f. 2, 1896: 154.

One of the most common ferns, growing in widely different stations, and ranging from the ravines of the treeless basal region to the highest woods and heaths. Found with ripe sori in the autumn and winter.

Masatierra: In all the quebradas between Pto Frances and Pto Ingles, common both in forested and in treeless tracts; numerous ravines near the colony, representing the last trace of indigenous vegetation; also on the elevated ridges separating V. Colonial from Villagra, 500—625 m (no. 590).

Masafuera: Forming extensive beds in the subalpine and alpine region, ranging nearly to the highest summits (1350—1400 m), also on the highest parts of the great western precipice; not uncommon in the forests and along the streams of the canyons etc., e. g. in Q. de las Casas (no. 458).

This interesting species which, as BOWER has proved, is generically distinct from *Alsophila*, is widely spread through tropical and subtropical America, in several rather distinct forms. The insular form has been identified with the one from South Chile (Polypodium cinereum Cav.). Still it seems to differ from this in its dense cover of wool on the lower surface of the midrib, the Chilean form being decidedly less woolly. Further, the specimens from the two islands differ from each other in pubescence; if this character be constant, each island is inhabited by its special form. The form from Masafuera differs from other ones especially by the very dense rusty brown wool on the midribs of the

secondary and tertiary pinnules. Besides the woolly hairs, the form from Masatierra shows numerous rather rigid, cylindrical, atropurpureous hairs. We have met with similar trichomes only in the Mexican form described as *Trichosorus glaucescens* Liebm., but in this they are very few while in the form from Masatierra they are so numerous as to give the lower surface of the frond a quite peculiar appearance.

Area of distribution: Mexico, Central and South America to Western Patagonia, 49° S. L. Juan Fernandez.

Dicksonia L'Hér.

18. **D. Berteriana** (Colla) Hook. Sp. Fil. 1: 67 tab. 23 A et auctt.; Hemsl. 66; Johow 1893: 21 f. 3, 1896: 154 tab. 16—17. — Syn. *Davallia Berteriana* Colla 1836: 37 tab. 65; *Balantium Berteroanum* Kze Anal. 40 (1837).

In the humid and protected gorges found as low as 2—300 m; on the forested slopes and ridges generally not seen below 400 m, becoming much more numerous higher up. In the region of the frequent fogs this stately fern forms very dense groves. Fertile in the autumn and winter.

Masatierra: C. Chifladores, plentiful above 500 m; Q. Laura and Q. Piedra agujeriada, from 400 m upwards; higher parts of Rabanal, common, solitary specimens as low as 450 m; C. Centinela, stray specimens in the brushwood, numerous in the woods above 500 m (no. 574); Pangal, in the gorge, fine trees observed as low as at 220 m; on the crest above the Pangal canyon, c. 800 m; V. Anson, fine trees on the slopes of La Damajuana (common from 500 m upwards) and of El Yunque (large specimens from 385 m, but now becoming rare;[1] C. Central, from 390 m and upwards, rare; V. Colonial, Q. seca, one tree seen at 435 m; C. Salsipuedes, filling the uppermost part of Q. Helechos, 660—450 m, with an almost pure and exceedingly beautiful stand; Pto Ingles, high up on the western slope (SKOTTSBERG 1908); Q. Villagra, mountain spur W. of El Yunque, c. 500 m, frequent; below the Portezuelo pass, not uncommon above 500 m; Q. de la Choza, solitary specimens at the altitude of 300 m, higher up more common.

The typical form of this endemic species seems to be confined to Masatierra. It is so closely related to *D. lanata* Col. from New Zealand that a person working with dried material only might be inclined to unite them.

var. **virgata** C. Chr. et Skottsb. nov. var. — Johow 1896 tab. 17.

Major, robustior, ad $6^1/_2$ m (vel ultra?) alta et 1 m diam. supra basin et infra ramos, saepe virgata, ramis 1—5 irregulariter dispositis. Pinnae soriferae ad 40 cm et ultra longae (in typo rarius ultra 20 cm), minus villosae. Sori conspicue majores, 2 mm diam. (in typo 1—1,2 mm).

Plate 2.

[1] Not few plants are dug out every year and sold to be transplanted in the gardens of Chile, where they do not thrive.

According to observations on living specimens and from a comparison of the material at hand we conclude that the *Dicksonia* which inhabits Masafuera differs from the type and deserves a special name. It is found growing in the higher forests, where it may form dense stands along the streams, and many groves are seen above the upper limit of the forest and on the grassy slopes of the ridges, though rarely below 500 m. On the slopes of Los Inocentes there is a contiguous belt of Dicksonia, forming an extensive, low, but exceedingly dense forest which offers considerable difficulties to the explorer; it may, however, be crossed along the Vacas ridge where it has been accidentally burnt in places. It reaches the altitude of about 1200 m. North of the Casas canyon, in the heath, scattered specimens are found; the last were met with at 1170 m. It is scarce in the northern and less humid parts of the island and was not seen by us at the tributaries to Q. Sanchez. We gathered fruiting specimens in August, 1908, but no ripe ones were found before our departure in 1917, March 15.

Masafuera: Q. del Mono, in the woods from 475 m; in the *Anthoxanthum* meadow on the higher slopes, from 530 to 1170 m; C. del Barril, not uncommon above 750 m; Q. del Blindado, forest ravine, 440 m (no. 515); Los Inocentes, scattered clumps below 750 m, thence forming closed groves, which dissolve at an altitude of 11—1200 m.

Area of distribution: Endemic.

Polypodiaceae.

Cystopteris Bernh.

19. **C. fragilis** (L.) Bernh.: C. Chr. Ind. 203. — *C. fragilis* var. *canariensis* (Willd.) Milde Fil. Eur. 152 sec. C. Chr. Arkiv för Bot. 10: 5 (1910).

Wet, shaded and sheltered corners in the deep canyons. (Fertile Aug., Feb.)

Masafuera: Q. de las Casas, under overhanging rocks (no. 508); Q. Lobería, exterior part of the gorge, under large stones.

Detected by SKOTTSBERG in the Casas valley, 1908. The present specimens are identical with those from 1908 which were referred to var. *canariensis*, and they certainly fall under this variety as circumscribed by MILDE. Still the variety comprises many rather different forms, and the form from Masafuera cannot very well be associated with the one from the Atlantic islands under the same name. It is a large, very thin-leaved form with fronds up to 30 cm long and with large sori; the lower side is rather glandulose-pubescent. Probably it is almost the same as var. *fumarioides* (Pr.) (*Athyrium fumarioides* Presl, Rel. Haenck. 1: 39 tab. 6 f. 2), based on Peruvian plants.

Since MILDE revised the numerous forms no pteridologist has tried to unravel the taxonomy of the species with due regard to geographical distribution.

Area of distribution: The species is the most cosmopolitan of all ferns, ranging from 83° lat. N. to South Georgia in the South Atlantic.

Dryopteris Adans. emend. C. Chr.

20. **D. inaequalifolia** (Colla) C. Chr. K. Danske Vid. Selsk. Skr. VIII. 6: 73 (1920). — Syn. *Polypodium inaequalifolium* Colla 1836: 49; *P. Berteroanum* Hook. Sp. Fil. 4: 269 (1862); *Nephrodium villosum* Hemsl. 75; Johow 1893: 35, pro parte sed non f. 19, 1896: 65 pro parte; *Polypodium punctatum,* Johow 1893: 36 f. 21, 1896: 166 (pro parte?); *P. vestitum* Johow 1893: 37 f. 22 (*non* Philippi); *Dryopteris villosa* cum var. *Berteroana* C. Chr. Arkiv f. Bot. 10: 13 (1910).

Plate 3.

One of the most common ferns, especially in all parts of the forest belt, but also in the devastated areas, in suitable stations. In the elevated montane forests and in well-watered gorges specimens with a short (up to 1 m high) straight stem are not uncommon. Fertile specimens will probably be encountered at any season.

Masatierra: In the woods of the valleys from Pto Frances to Juanango, ranging from 250 m (or less) to at least 650 m (nos. 65, 161, 275, 339, 604, 1151); equally common in the wooded part of the south side (no. 274). Also in the old caves, no. II (rare) and no. VI (no. 1152), situated near the landing-place in B. Cumberland.

Masafuera: We are unable to tell whether all the specimens observed in this island belong to f. *glabrior* (see below) as from many localities no specimens were preserved. Q. de las Chozas, in the forest, 570 m; Q. del Mono, 475 m; Q. de las Casas, under rocks (no. 466); Q. del Blindado, in forest 440 m; Q. de las Vacas (no. 448); Q. Inocentes, in Dicksonia-forest; Q. Angosta, 1 km from the entrance, at the waterfall; Q. Lobería; SE slope of Los Inocentes, c. 950 m (highest altitude observed).

The present species which is dealt with in details by CHRISTENSEN (Monogr. Dryopteris Pt. II) was confounded by JOHOW with *Hypolepis rugosula* which is proved from his figures and also from his herbarium. It belongs to a group of closely allied species distributed through tropical America. The south Andine *D. spectabilis* (Klf.) (Syn. *Polypodium vestitum* Phil.), to which JOHOW referred a form of *D. inaequalifolia,* is more remotely related to our species than are several of the other members of the group.

The typical form is probably confined to Masatierra; the Masafueran form has been named f. *glabrior* by CHRISTENSEN and SKOTTSBERG, l. c. C. CHR. 1920.

Area of distribution: Endemic.

Polystichum Roth emend. Schott

21. **P. Berterianum** (Colla) C. Chr. Ind. 579; Arkiv för Bot. 10: 19 (1910). — Syn. *Aspidium Berterianum* Colla 1836: 42 tab. 70; *A. flexum* Kze Anal. 44 (1837); Hemsl. 75; Johow 1893: 34 f. 18, 1896: 164. *A. capense* Hemsl., Johow ll. cc.

This is the most wide-spread fern in the islands, growing from near the sea level to the highest ridges in Masatierra and reaching the subalpine heath in Masafuera. In habit it varies a great deal according to external conditions; the form of the sunny places is easily mistaken for *P. adiantiforme* Forst. In sheltered places it grows larger, with a plane, less rigid frond. — Fertile at any season, principally in late summer and autumn.

Masatierra: Common in all the valleys and on the dividing ridges (in the devastated areas mostly confined to the shallow ravines), from Pto Frances to Juanango, and, on the south side, as far west as B. Chupones (Tierra Amarilla). Also noted in Cave X near the landing-place in B. Cumberland. (Nos. 54, 149, 281, 588, 612.)

Masafuera: In the canyons and on the dividing ridges and plains, from B. Toltén round the island to Q. Lobería; also among rocks in the subalpine-alpine heath, at least to 1100 m. Small specimens on C. Atravesado, c. 1350 m. (Nos. 449, 552, 554.)

We are absolutely convinced that only one species of the group of *P. adiantiforme* (Aspidium capense) occurs in the islands. The single specimen referred to the last mentioned by HEMSLEY has turned out to be only *P. Berterianum*. On the other hand we cannot agree with JOHOW who proposed to reduce *P. Berterianum* to a variety or form of *adiantiforme*. In Arkiv för Bot. l. c. the differences are pointed out, and the characters mentioned there hold good with one exception: the pinnae are often alternate. Most specimens show the brown drops of gum on both surfaces never observed in *adiantiforme*.

Area of distribution: Endemic.

22. **P. vestitum** (Forst.) Pr. Tent. 83 (1836); C. Chr. Ind. 588. — Syn. *Polypodium vestitum* Forst. Prodr. 82 (1786); *Aspidium vestitum* Sw.; Mett. Aspid. no. 101 var. b; *A. aculeatum* Hemsl. 74; Johow 1893: 33 f. 17, 1896: 164; *Polystichum orbiculatum* C. Chr. Arkiv för Bot. 10: 18 (1910).

Fairly common in well-watered ravines and in the woods, from a few hundred m to the elevated ridges, in Masafuera also in the alpine region. Fertile specimens may be seen at any time, but are probably commoner during the summer and autumn.

Masatierra: C. Chifladores, slopes above Pto Frances, c. 500 m, common in the forest; C. Centinela, from 530 m upwards; Q. Damajuana, waterfall at 250 m (no. 53); C. Central, in clearings, c. 400 m; quebradas in the bottom of V. Colonial (nos. 48, 152, 334), also in thickets of *Aristotelia maqui* near the road to Portezuelo (no. 1174); C. Salsipuedes, brushwood on the ridge,

615 m and in Q. Helechos, 660 m; Q. Juanango, c. 200 m; Q. Villagra; Q. de la Choza, in forest 250 m.

Masafuera: Q. del Mono, in the woods, 4—500 m; Q. del Blindado, forest, 440 m; Q. de las Casas, in the canyon (no. 555); Q. Angosta, c. 1 km from the entrance, at the waterfall; the Correspondencia Camp in the ravine, 1160 m; edge of the western precipice, at Las Torres, 1370 m; summit of Co Correspondencia, 1420 m.

It may be doubted whether the *aculeatum*-form of Juan Fernandez really is identical with *P. vestitum*. In most characters it certainly agrees with specimens from Australia while, on the other hand, it differs much from the more common form of New Zealand (*P. venustum* Hombr. et Jacq.). It is dark green above, rather soft in texture, the basal scales black with pale borders, the scales of the rhachis reddish, thin, tapering from the broad lacerate base into a long, contorted, hairlike apex but always lacking the black scales of *P. venustum* (= *P. vestitum* Christ Arkiv för Bot. 4: 5). The upper basal pinnules are often much lengthened and fully pinnate. The reference in 1910 to *P. orbiculatum* was due to the misinterpretation of the latter by CHRIST.

Area of distribution: Taken in a wide sense, the species inhabits Subantarctic America, Juan Fernandez, Australia and New Zealand.

Arthropteris J. Sm.

23. **A. altescandens** (Colla) J. Sm. Hist. Fil. 225; C. Chr. Ind. 62. — Syn. *Polypodium altescandens* Colla 1836: 48; *Nephrolepis altescandens* Baker, Hemsl. 76; Johow 1893: 35 f. 20, 1896: 165. *Polypodium procurrens* Kze Anal. 17.

Only found in the lower parts of the forest region, trailing over stones and fallen stems or climbing to a considerable height in the trees. (Fertile Aug., Dec.—April.)

Masatierra: Pto Frances (JOHOW); Pangal, common from one hundred m upwards; Q. Damajuana, c. 250 m, very common on the trees (no. 60); V. Anson, in the woods surrounding the Plazoleta del Yunque; C. Central, c. 400 m, numerous; V. Colonial, quebradas in the interior, not uncommon 250—350 m (no. 44); Q. Juanango.

Masafuera, rare: Q. de las Casas (detected 1908), in the canyon; in 1917 only seen on a tree fallen down from the steep wall (no. 507).

This endemic fern is a pronounced Polynesian element in the flora. No American species is known to which it might be compared, while, on the other hand, some Polynesian forms, especially from Samoa, which have been referred to the collective species *A. obliterata* (R. Br.) J. Sm. are intimately related to our species. Other very close relatives grow in Queensland (see DOMIN, Bibl. Bot. Heft 85: 60—64 c. figs.). The African *A. ramosa,* generally but incorrectly united with the eastern Polynesian forms, and the Australian *A. tenella* are both more remotely related to it. The main difference between *A. altescandens* and the Samoan form mentioned, which are both green when dried and appar-

ently exindusiate, lies in the base of the lamina. The Samoan plant has a gradually narrowed base leaving only a very short stipe free of pinnae; *A. altescandens* has the stipe 3—5 cm long and the lamina scarcely narrowed downwards, although frequently a single shortened basal pinna is present. The midribs of the pinnae are softly villous with articulate hairs in *A. altescandens;* such hairs occur only sparingly in the Polynesian species.

Area of distribution: Endemic.

Asplenium L.

24. **A. obliquum** Forst. 80 (1786) var. **chondrophyllum** (Bert.) Mett. Aspl. 137 no. 21. — Syn. *A. chondrophyllum* Bertero ex Colla 1836: 40 tab. 68; *A. obtusatum* Hemsl. 74; Johow 1893: 31 f. 14, 1896: 162; C. Chr. Ind. 124 pro parte.

Along the sea shore, in crevices and under overhanging rocks. Probably fertile the year round.

Masatierra: B. Cumberland (JOHOW); Puerto Ingles, not uncommon (no. 313, also listed by JOHOW).

Santa Clara: JOHOW.

Masafuera: Not uncommon on the cliffs from Q. del Ovalo along the coast to Pta Negra and probably also in other places (no. 511); also in the interior of Q. de las Casas.

The differences between the two species of FORSTER, *A. obtusatum* and *A. obliquum,* were clearly explained by METTENIUS, and we do not doubt that they are both good species, distinguished besides by the number and shape of pinnae especially by the different scales on the lower side of the lamina. In *A. obtusatum* these scales are minute, dilacerate, in *A. obliquum* ovate, entire, acuminate. The Juan Fernandez form agrees with *A. obliquum* in its scales, but the more common, smaller form, figured by COLLA, has much the aspect of *A. obtusatum;* still forms have been collected that scarcely differ in size from *A. obliquum,* so that it seems quite natural to refer it to that species as a variety. From both the Australian species the variety differs by the colour of the basal scales, which are reddish brown and not dirty ferrugineous as in the others.

Similar forms from Chile were described as *A. sphenoides* Kze and *A. consimile* Gay; they have the dirty brown basal scales of typical *obliquum,* and their rather numerous pinnae are shortly acuminate, the margins duplicato-serrate with rather acute teeth, while var. *chondrophyllum* sometimes has nearly entire, sometimes obtusely serrate, obtuse pinnae.

Area of distribution: South Chile; Juan Fernandez; Australia, New Zealand. Typical *chondrophyllum* only known from Juan Fernandez.

25. **A. macrosorum** Bertero ex Colla 1836: 39 tab. 67 (bona); Kunze, Anal. 21 (1837); Hemsl. 74; Johow 1893: 32 f. 16, 1896: 162.

Plate 1, Fig. 2.

Apparently not at all so rare as JOHOW believed; characteristic of rich humous soil in the montane woods within the foggy region. (Fertile Dec.–March.)

Masatierra: C. Chifladores, woods in the highest part of the Frances valley, c. 500 m, rare; dense forest on the ridge between Q. Laura and Q. Piedra agujeriada, c. 600 m, and in the last-mentioned quebrada, 650 m; Rabanal, in the upper part; C. Centinela, 560 m (no. 1179); V. Anson just below the gap between La Damajuana and El Yunque, in rich woods, c. 500 m (no. 157; also P. ARREDONDO in herb JOHOW!); C. Central, 390 m, small and very rare, scattered at 500—550 m (no. 302); C. Salsipuedes, Q. Helechos, c. 650 m, one tuft under a stone in the *Dicksonia*-forest (no. 94); Q. Villagra, mountain ridge W. of El Yunque, c. 500 m, rare.

***Masafuera:** Q. de las Chozas, rich woods above 500 m (no. 364); C. del Barril, fissures in the rocks, c. 750 m (no. 406); SE. slope of Los Inocentes, *Dicksonia*-forest, 840 m (no. 533). — New for this island.

A very distinct species with doubtful relationship: several species partly resembling it are found in many regions of both hemispheres, still it is probable that it might be placed next to *A. obtusifolium* L. and *semicordatum* Raddi, both widely dispersed through tropical America. It differs from both by its shining, dark castaneous stipe and rhachis, its few pinnae and large sori. The texture cannot be called subcoriaceous as stated in Syn. Fil., but is rather thin although firm, pellucid. It varies in the number of pinnae; generally there are 1—2 to each side of the terminal large one; they are equally cuneate or sometimes unequal with the lower side more arcuate, quite as in the two species mentioned above. In the larger specimens from Masatierra the base of the terminal pinna often has one side arcuately excised. The indusium, which is greyish, entire and often a little arcuate, covers the young sorus; in the mature ones, $^1/_2$—$2^1/_2$ cm long and $2^1/_2$ mm wide, the indusium is quite hidden by the reddish brown sporangia.

Among the specimens from Masatierra there is a luxuriant form, with 3—4 lateral pinnae on each side, the basal ones with a nearly free secondary pinnule on the lower side.

The plants from the two islands are as a whole similar, still those from Masafuera are smaller than those from Masatierra with narrower pinnae, the terminal one equal-sided.

Area of distribution: Endemic.

26. **A. stellatum** Colla 1836: 41 tab. 69; C. Chr. Arkiv för Bot. 10: 5 (1910). — Syn. *A. fernandezianum* Kunze, Anal. 22 (1837); *A. lunulatum* Hemsl. 73; Johow 1893: 32 f. 15, 1896: 162; C. Chr. Ind. 119 pro parte (*non* Sw.).

Not uncommon in the montane forests from Pto Frances to Vaquería, also found in more open places at a lower altitude; less common in Masafuera. (Fertile Aug., Dec.—April.)

Masatierra: Pto Frances, brushwood on Loma Incienso, c. 350 m, forming a carpet on earth-covered stones (no. 128); on the slope of C. Chifladores, rocky soil in the forest, c 500 m; La Damajuana, c. 450 m; NE. slope

of El Yunque (no. 1149); C. Central, c. 470 m (no. 309); just below the Portezuelo pass, c. 500 m (no. 133); north face of Co Pirámide, c. 580 m; Vaquería, c. 250 m.

Masafuera: Q. de las Chozas, in dense forests, 5–600 m (no. 545); C. del Barril, among rocks, 985 m (no. 532); Q. de las Casas, under overhanging rocks in the bottom of the canyon (no. 509).

A considerable number of specimens show that this is a variable species, varying in size, and in shape and cutting of the pinnae. COLLA's figure is not good as it does not show the shortened lower pinnae, which are more or less fanshaped with flabellate venation. The leaves often produce new plants at their tips, whose leaves are again proliferous. The stipe is some times winged with the wing broadest below, sometimes unwinged. Lamina more or less thin, dark green (yellowish in open places), the rhachis narrowly alate throughout. In some specimens the pinnae resemble COLLA's plate, but they are often shorter and broader, with a rounded or obtuse apex, commonly with a lobed auricle at the upper base, more or less excised at the lower, the large lobes entire or cleft.

A. stellatum belong to the *A. lunulatum*-assemblage, spread through the tropics in many varieties. Recently HIERONYMUS (Hedwigia 60, 1919) described or restored a series of species of this group. Under the new species *A. tabinense* he mentions *A. fernandezianum* Kze, a younger name for *A. stellatum*.

A. stellatum seems to combine several characters, of which one or more are found now in one, now in another of the allied species. In general habit it mostly resembles the South African *A. erectum* Bory, in its winged rhachis and stipe *A. pteropus* Klf., common in tropical America. From the latter, which may be considered as its nearest relative, it differs in the coal black, rigid basal scales.

Area of distribution: Endemic.

27. **A. magellanicum** Klf. Enum. 175 (1824); Hemsl. 74; Johow 1893: 32, 1896: 163.

Found in several distant stations, but not common; chiefly in the woods or in wet moss near running water. Probably fertile at any season.

Masatierra: C. Chifladores, dense forest on the slope towards Pto Frances, c. 500 m; Pangal, at the cascade, in wet moss; Q. Damajuana, at the foot of a small waterfall (no. 61); in the woods on both sides of Portezuelo: along the stream, on the ground and on trees.

Masafuera: Forest on the Sanchez plain, 515 m; Q. de las Chozas, dark ravine under *Dicksonia;* Q. del Mono, dry bed of the stream, 570 m (no. 461); Q. de las Casas, in the canyon (no. 452); Q. del Blindado, on the ground and on trees and arboreous ferns, 440 m; Q. Angosta, about 1 km from the entrance, at the waterfall; Q. Lobería, along the stream and in the forest patch at 200 m; the Correspondencia Camp, in the *Lophosoria*-beds, and in moss mats at the foot of Las Torres, 1370 m.

The island specimens do not quite agree with continental ones. They are

a little larger with an ovate-oblong lamina (sometimes even broadly lanceolate), rarely deltoid as the common form from southern Chile; the lobes are broader and more distinctly toothed at the outer edge and the texture thinner. In general outline, the type recalls *A. ruta muraria,* the island form rather *A. adiantum nigrum.* Some specimens are seen on Plate 1 Fig. 1.

Area of distribution: Southern Chile to Fuegia and Falkland Islands; Juan Fernandez.

Blechnum L.

28. **B. auriculatum** Cav. Descr. 262 (1802); C. Chr. Ind. 151. — Syn. *B. hastatum* Klf. Enum. 161; *Lomaria hastata* Kze Farrnkr. tab. 55 f. 2; *B. australe* Hemsl. 73; Johow 1893: 26 f. 9, 1896: 158.

Fertile at any time of the year.

Masatierra: Never wanting on the low, treeless slopes, sometimes very common on the loose tufas, where few other species grow, so in V. Colonial etc. etc. In inhabits the dry regions between Villagra and Pta Larga. It is also found in all the forests (no. 55) and on the high ridges among shrubs. It grows in almost all the caves near the landing-place in B. Cumberland (no. 586, from cave II is a large luxuriant form).

Santa Clara: JOHOW.

Masafuera: Very common (no. 493).

According to our opinion this species is not conspecific with the South African *B. australe* L. It varies considerably in the islands and JOHOW distinguished three varietis. The present collection contains the following forms.

1) A large form, like the continental one, fronds up to 70 cm long (stipe 20 cm) and 8 cm broad, lower reduced pinnae distant, sori often interrupted. This is JOHOW's var. 1, fig. 9 a (well illustrated by KUNZE, l. c.). JOHOW's var. 2, fig. 9 b is only a slender form of the same.

2) *remotum* (Presl). — Syn. *B. remotum* Pr. Tent. 103 (1836, nomen); *Mesothema remotum* Pr. Enum. 111 (1849); *B. pubescens* Hook. Ic. plant. tab. 97 (1837), Gay 6: 478 (non Desv.); *Lomaria pubescens* Kze Farrnkr. 1: 122 tab. 55 fig. 3 (1843).

Prominent pteridologists have regarded this as a distinct species. A comparative examination of a large material shows that no definite limit can be drawn between this and typical *B. auriculatum. B. remotum* is smaller and has a much shorter stipe, further it is densely pubescent on stipe and rhachis, characters which undergo great changes according to the external conditions. *B. remotum* is the form of more open situations. On the arid slopes and higher, stony ridges another reduced form is found, which might be called f. *parvula* (Phil.). — Syn. *B. parvulum* Phil. Anal. Univ. 1873: 580 (t. spec. Mus. Nac. Santiago!); C. Chr. Ind. 158. This has been mistaken for *B. penna marina* (Poir.) Kuhn (= Lomaria alpina Spr.), by Hemsl. 72; Johow 1893: 31, 1896: 161 doubted its existance. In the present collection there are specimens of typical *parvula* from Masatierra, C. Salsipuedes, 750 m (no. 92); it was

also observed on arid slopes in B. Chupones and on Masafuera; C. del Barril, 740 m.

Area of distribution: Temperate South America. Juan Fernandez.

29. **B. valdiviense** C. Chr. Ind. 160 (1905). — Syn. *Lomaria blechnoides* Bory 1825 et auctt., Hemsl. 71; Johow 1893: 30 f. 13, 1896: 160; *L. lanceolata* Spr.?, Colla 1836: 45; *L. l'Herminieri,* Hemsl. 72, Johow 1893: 30, 1896: 161 (pro parte); *B. arcuatum* Phil. Anal Univ. 94: 352 (1896), *non* Remy; *B. australe* var. *parvulum*, Johow (spec. e Masafuera).

Generally confined to the forest and preferring the shadiest parts, seldom seen in more open situations. Fertile fronds develop during the summer and ripen Feb.—April.

Masatierra: C. Chifladores, slope above the innermost part of Pto Frances, c. 500 m; ridge between Q. Laura and Q. Piedra agujeriada, 650 m; Pangal (JOHOW); N. slope of La Damajuana, c. 450 m; the crest separating the Q. Damajuana from V. Anson, on rocks, 150 m; along the road to Portezuelo, in the woods (nos. 153, 589); Q. Gutierrez (no. 49); C. Salsipuedes, Q. Helechos, 660 m, rather common and also epiphytic; Pto Ingles (JOHOW); Q. Juanango, very large plants (no. 611); Q. Villagra, here and there near the path; Q. de la Choza, dense forest, 250—300 m, very numerous.

Masafuera: Q. de las Chozas, dry bed of a stream; Q. del Mono, dark ravine, 570 m; Q. de las Casas, humid sheltered corners (no. 510); Q. del Varadero, dark fissures below the waterfall; Q. Angosta, at the waterfall; Q. Lobería, forest patch, 280 m. In the alpine region: C. del Barril (no. 531); edge of western precipice at the foot of Las Torres, 1370 m (no. 422).

A fairly constant species, varying mainly in size. The rhizome is commonly described as creeping. This is not quite correct. It is erect from the first, but soon produces underground runners, from which new plants arise; with age these give rise to new runners with fasciculate leaves. The scales of the rhizome are entire.

B. valdiviense is certainly related to *B. lanceolatum* (R. Br.) from Australia and New Zealand but well characterized. Small plants resemble *B. penna marina,* and young plants of *B. Schottii* may be confounded with *B. valdiviense,* but will be recognized by the dentate scales of the rhizome, which is long and slender, by the scattered leaves and the prominent hydathodes on their upper surface just within the margin.

We have little doubt that *L. lanceolata* Colla and *L. l'Herminieri* Hemsl. (not Bory) quoted above must be referred to *B. valdiviense.* Hemsley quoted specimens collected by BERTERO and by MOSELEY: the former is beyond doubt the L. lanceolata, which according to COLLA's few remarks seems to be ordinary B. valdiviense, and the latter is perhaps a large form of the same. JOHOW reprinted HEMSLEY's remarks with the addition that he had collected it in Masatierra and that it might be united with L. attenuata (= B. Schottii). This is no wonder for JOHOW's specimens (!) are B. Schottii. The genuine B. l'Herminieri Bory, a West Indian species, does not occur in Juan Fernandez.

Area of distribution: South Chile, Valdivia and Chiloé; Juan Fernandez.

30. **B. Schottii** (Colla) C. Chr. Arkiv för Bot. 10: 7 (1910); SKOTTSBERG K. Sv. Vet. Akad. Handl. Bd. 51 no. 9 tab. 7 f. 3. — Syn. *Lomaria Schottii* Colla 1836: 44 tab. 72; *L. attenuata* Hemsl. 71; Johow 1893: 29 f. 12, 1896: 160; *L. l'Herminieri*, Johow l. c. pro parte; *L. fernandeziana* Phil. Anal. Univ. 43: 105 (1873); *L. bella* Phil. Linnaea 29: 105 (1857).

Not uncommon in the forests, often climbing on trees and arboreous ferns. The fertile fronds are developed in late summer and ripen in March—April.

Masatierra: From Pto Frances to Juanango, ranging from about 200 m to 6 or 700 m (nos. 286, 564, 1180); also on the south side, in the quebradas of Villagra.

Masafuera: Q. de las Chozas, in forest 475 m (no. 517); Q. de las Casas, not rare in the canyon.

In 1910 the reasons were given why this should be considered a distinct species, and the differences between it and the closely allied *B. attenuatum* (Willd.) and *B. meridense* (Kl.) C. Chr. were explained. We can add that the basal scales are more distinctly toothed and frequently concolorous in *B. Schottii*, subentire and black in the centre in *B. meridense*.

No. 1180 is an anomalous form with the sterile pinnae deeply pinnatifid in the external half, with subfalcate, acute segments.

Area of distribution: Endemic.

31. **B. chilense** (Klf.) Mett. Fil. Lechl. 1: 14 (1856); C. Chr. Ind. 152. — Syn. *Lomaria chilensis* Kaulf. Enum. 154 (1824); *L. capensis* Hemsl. 73; Johow 1893: 28 f. 11, 1896: 159; *L. Reedii* Phil. Anal. Univ. 43: 581 (1873).

Fairly common in the woods, preferring open glades and stony ground near running water; also in the drier tracts. Fertile fronds develop during the summer and ripen Feb.—March.

Masatierra: Pto Frances, scattered in the forest, c. 500 m; C. Centinela, in the woods; Pangal, west branch on dry open ground; main gorge, at the waterfall; Q. Damajuana, small waterfall, c. 250 m; V. Colonial, in all the quebradas, common along the road to Portezuelo (no. 565, no. 331 f. anomala); C. Salsipuedes, up to 670 m; Q. Juanango, along the brook, c. 200 m; Villagra common in the large quebrada; S. slope of Co Chumacera, in the *Boehmeria*-grove; B. Chupones, 2—300 m.

Masafuera: Q. de las Chozas, dry bed of a stream, 570 m (no. 437); Q. de las Casas, common along the course of the stream; Q. Angosta, at the waterfall; Q. del Varadero, waterfall; the Correspondencia Camp, in the ravine 1160 m; heath near Las Torres, 1350 m (dwarf specim.).

B. chilense belongs to a group of closely allied species which by some authors are united under the name *B. capense* (Thunb.) Schlecht. This group has never been critically revised. For the present it cannot be decided which of the numerous species described should be regarded as valid. Here we prefer to deal with *B. chilense* as a separate species, although we are not prepared to give good distinctive characters.

According to JOHOW *L. Reedii* is a form with fronds partly fertile, partly sterile. Such anomalous forms are occasionally met with in other members of the group. No. 331 of the present collection is such a form, with all the pinnae

on one side fertile, and sterile on the other, corresponding to *B. procerum* figured by LABILLARDIÈRE, Nov. Holl. Pl. Spec. tab. 247.

Area of distribution: Central Chile to West Patagonia, Falkland Islands; Juan Fernandez.

32. **B. cycadifolium** (Colla) Sturm, Enum. pl. cr. vasc. chil. 23 (1858); C. Chr. Ind. 152. — Syn. *Lomaria cycadifolia* Colla 1836: 43 tab. 71; Johow 1896: 158; *L. lanuginosa* Kze Anal. 19 (1837), Gay 6: 479; *L. Boryana* Hemsl. 72; Johow 1893: 27 f. 10; *B. magellanicum* var. *cycadifolia* C. Chr. Arkiv för Bot. 10: 9 (1910).

Plate 4.

Fertile in March—April.

Masatierra: Characteristic of all the high ridges in the eastern and central parts, forming very dense growths above 4—500 m (no. 580) and reaching the summit of El Yunque (940 m) where stout specimens may be seen with field glasses. In the dense forest it is scarce, but on open, drier mountain ridges with scattered trees it is again common. It is also encountered in the treeless basal region, from Pto Frances to Pto Ingles, descending to 30 m above sea level. On the south side of the island, small specimens were found as far west as in B. Chupones.

Masafuera: On the ridges, in the alpine heath etc., smaller than in Masatierra buth otherwise typical; Q. del Mono, one small plant at the roadside; C. del Barril, 700—1200 m; alpine heath near the Correspondencia Camp, 1130—1350 m (no. 405); Western precipice of C. Atravesado, well developed; slopes of Los Inocentes, scattered in the *Dicksonia*-belt, important in the typical alpine heath 1350—1450 m.

This, the »Cycas-fern», is certainly closely related to *B. magellanicum* (Desv.) Mett., to which it has been referred as a variety. From examination of dried material alone it is difficult to find good distinctive characters, but collectors apologize for its validity as a species (see JOHOW l. c.). It is a true tree-fern with a stout, often slightly curved stem and very rigid, shining leaves.

Area of distribution: Endemic.

33. **B. longicauda** C. Chr. Arkiv för Bot. 10: 10 tab. 1 (1910). — Syn. *Lomaria* sp.?, Johow in sched. herb!; *Asplenium longissimum,* Johow 1893: 33, 1896: 163, *non* Bl.

Fig. 5. — Plate 5.

In the quebradas, on stony or rocky soil, along running water, at the waterfalls etc., often pending from the rocks and forming fine carpets on the walls of the canyons. Not uncommon. Almost ripe fertile fronds were gathered in February.

Masafuera: Q. de las Chozas, 450—500 m, dry bed of a stream (no. 365); Q. del Mono, 570 m; Q. de las Casas, in the canyon, luxuriant (no. 420); Q. del Blindado, 440 m, in the bottom of a wooded ravine; Q. Angosta, 1 km from the entrance, at the waterfall; Q. del Varadero, at the waterfall; Q. Lobería, waterfall in the gorge, 190 m.

This highly remarkable fern was discovered by JOHOW in Q. de las Casas, and again found in the same locality by SKOTTSBERG, 1908. A beautiful lot

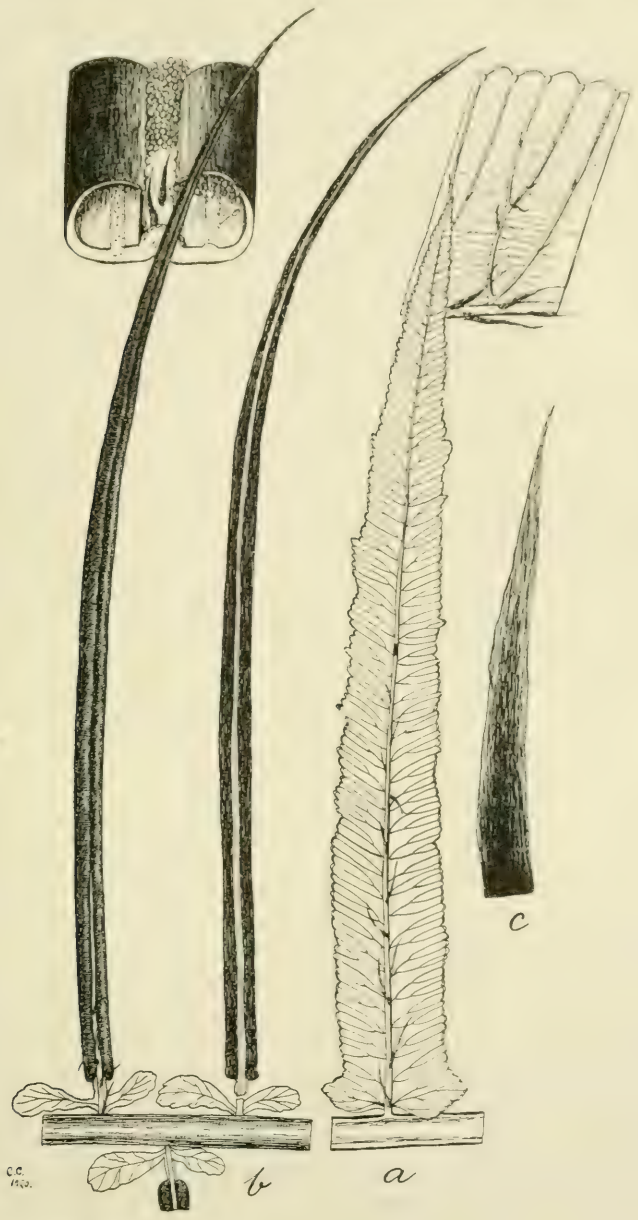

Fig 5. *Blechnum longicauda* C. Chr. *a* sterile pinna, nat. size, and enlarged fragment; *b* two fertile pinnae, nat. size, and enlarged fragment; *c* palea form the stipe, × 5.

of specimens, including fertile fronds, enable us to complete the original description.

The rhizome is short, more or less erect, the fronds densely fasciculate. When growing between stones along the water, the species has much the habit

of B. chilense. Rhizome and stipe are covered with thick, entire, lanceolate, castaneous scales, 1,5 cm long by 3 mm broad. The upper part of the stipe and the rhachis have similar but smaller scales. Stipe short, rarely 10 cm long, angular as is also the rhachis, compressed, over $^1/_2$ cm broad, deeply furrowed above. The numerous almost sessile, horizontal pinnae of the sterile frond are more or less subcordate at base with lateral lobes overlapping the rhachis. The lower pinnae are dwindling downwards, the lowest nearly semicircular. Not all the sterile leaves are proliferous, the fertile never so. Fertile fronds have very numerous, very long and narrow linear pinnae, 12—16 cm long by 2—3 mm wide only. Indusium coriaceous, nearly black, very closely imbricated and first opening at full maturity, the edges entire or faintly and repandly toothed. Lower reduced pinnae sterile and similar to those of the sterile frond, fertile pinnae in some specimens with a basal leafy obovate segment, corresponding to the basal lobes of the sterile pinnae; in others these sterile lobes are totally missing.

B. longicauda differs widely from all other species except from *B. Sprucei* C. Chr. (Lomaria caudata Bak.) from Ecuador, to which it is closely related. We have seen the original specimens of the latter in Herb. Kew; if they are of an average size, what we do not know, this is a much smaller species. It differs mainly in the shape of the sterile pinnae, which are much shorter and suddenly contracted into a subobtuse apex, rather unlike the long narrow one in our species. The fertile pinnae are also shorter and narrower. The rhachis is perhaps more densely pubescent.

Area of distribution: Endemic in Masafuera.

Pellaea Link.

34. **P. chilensis** Fée, Gen. 129 (1852); C. Chr. Ind. 479. — Syn. *Cincinnalis chilensis* Fée, Gay 6: 447; *Nothochlaena chilensis* Sturm 1858; Hemsl. 77; Johow 1893: 40 f. 25, 1896: 169.

Dry sunny cliffs, generally near the sea, very local. Probably fertile at any time.

Masatierra: near Pto Frances (SCHREIBER t. JOHOW); Q. Piedra agujeriada, 30—40 m (BÄCKSTRÖM); Pangal, far into the gorge, rocky wall 210 m; near the road from the colony to Pangal, on steep rocks above the sea, 45 m (no. 100).

Masafuera: GERMAIN! without locality; cliffs near the landing-place at Q. de las Casas, c. 20 m (no. 410).

Very near, or too near the Andine *P. nivea* (Poir.) Prantl, differing from it mainly in its sessile pinnules and generally more oblong segments.

Area of distribution: Endemic.

Hypolepis Bernh.

35. **H. rugosula** (Labill.) J. Sm. Bot. Mag. 72, Comp. 8, 1846 (»rugulosa»). — Syn. *Polypodium rugosulum* Labill. Nov. Holl. Pl. Spec. 2: 92 tab. 241 (1806); *Dryopteris punctata* subsp. *rugosula* C. Chr. Ind. 287.

var. **Poeppigii** (Kze). — Syn. *Polypodium Poeppigii* Kunze, Linnaea 9: 50 (1834); *Phegopteris Poeppigii* Fée, Gay 6: 506; Mett. Pheg. no. 13; *Polypodium rugulosum* Klf. Enum. 122 et auctt.; *P. punctatum* Hemsl. 76 (excl. syn. *Phegopteris spectabilis*); Johow 1893: 36 pro parte (*non* fig. 21), 1896: 166 pro parte; *Nephrodium villosum* Johow 1893: 35 pro parte, fig. 19, 1896: 165 (t. spec. in Herb Johow! *non* auctt.); *Hypolepis Poeppigiana* Mett. Fil. Lechl. 1: 18 (1856); *Dryopteris punctata* C. Chr. Ind. 555.

Seems to thrive under very different conditions, in dense or open forests, on barren slopes at the roadsides etc. Probably fertile at all seasons.

Masatierra: Q. Piedra agujeriada, c. 650 m (no. 596); V. Colonial, barren slopes (no. 120) and in the caves no. IV and V (common, no. 587); Q. Villagra, just below the Portezuelo pass (no. 276).

Masafuera: Near the abandoned Chozas village, roadside, 400 m (no. 439); Q. del Blindado, forest, c. 440 m; C. del Barril, 985 m; Q. de las Vacas; Q. Angosta, at the waterfall.

The many specimens collected clearly belong to the Chilean *Pol. Poeppigii*, and this cannot be separated from *H. rugosula* as a distinct species. Kunze found that the essential differences between his Poeppigii and rugosulum of Labillardière (the specific name erroneously written »rugulosum» by all authors) were the lax texture and the obtuse, approximate secondary pinnules of the former. It is true that most specimens show these characters, which, however, vary with difference in shade and humidity. The shade form (e. g. no. 587) belongs to typical *Poeppigii*, but specimens from open soil are scarcely distinguishable from typical *P. rugosulum* from Australia, where the texture in the less humid climate becomes more thick, and the pinnules are more distant and more acuminate. In all other characters specimens from the two regions closely agree, and it is, therefore, impossible to deal with *Poeppigii* as a species, perhaps even as a distinct variety. The specimens from Juan Fernandez are also very similar to *Polypodium viscidum* Roxb. (= *Hypolepis helenensis* Fée) from St. Helena, and there is little doubt that *P. villosoviscidum* Thouars from Tristan d'Acunha is the same. All these names are quoted as synonyms of *P. rugosulum* Labill.; the name of Thouars was published in 1804 and consequently has priority, but having seen no specimens, we shall not venture to create a new combination.

H. rugosula is frequently referred, as a variety or subspecies, to *Pol. punctatum* Thunb., the type of which is from Japan. A comparative study of specimens from different regions will show, we believe, that *H. rugosula* is a distinct species of more southern distribution. Both certainly belong to *Hypolepis*, not to *Dryopteris*.

In 1856 Mettenius described some specimens from Chile, previously referred to *Pol. Poeppigii*, as *Hypolepis Poeppigiana*, while he retained the spe-

cies of KUNZE under *Phegopteris*. Having examined specimens determined by METTENIUS himself we must confess that we do not understand how this keen observer has arrived at such an unnatural conclusion. The only difference between the two species accepted by METTENIUS (and under two different genera!) is that *H. Poeppigiana* has the fertile lobe somewhat protruding and finally recurved, covering the sori, while, in *Ph. Poeppigii*, the fertile and sterile lobes are alike, the fertile ones recurved with age. A study of more comprehensive material will show whether this difference is sufficient for the maintaining of two species; as a character of genera it is absolutely artificial. In this place it is sufficient to state that all specimens from Juan Fernandez belong to *Ph. Poeppigii* of METTENIUS.

The present species was greatly misunderstood by JOHOW, which is proved by his figures and remarks as well as by his specimens. His *Polypodium punctatum* is for the greater part *Dryopteris inaequalifolia*, while *Hypolepis* was figured as *Nephrodium villosum;* but his remarks on the latter clearly refer not to *Hypolepis*, by but to *D. inaequalifolia*. While this has an erect, sometimes subarborescent caudex, *Hypolepis* has a widely creeping, slender rhizome, which character alone, not to speak of the numerous others, will at one serve to distinguish the two plants.

The specimens collected look rather different, diverging in size, cutting, and texture. The largest ones, which could be named *H. rugosula typica*, have a firm, broadly ovate lamina, 35 cm long by 25 wide, fully tripinnate-quadripinnatifid, the tertiary pinnules being deeply pinnatifid. Others, corresponding to *Nephrodium villosum* of JOHOW, are of the same length and texture, but with a narrower lamina (12—16 cm), the basal pinnae considerably reduced, bipinnate-tripinnatifid, with obtuse secondary pinnules. This form corresponds very well to *Pol. Poeppigii* of KUNZE. There is a thinner shade-form of the same. Finally we have the fine form growing in the caves (no. 587). This has a thin, bright green lamina, lanceolate in outline (25 by 10 cm), barely pinnatifid with lobed secondary pinnulae. A specimen from Masafuera is smaller still (no. 439) the fully fertile leaves, of a rather firm texture, are only 12 by 4 cm, lanceolate, bipinnatifid. Such specimens approach very much *H. obtusata* (Pr.) Kuhn (syn. *Polypodium fulvescens* Hook et Grev., t. spec. orig. in Herb. Kew), a high Andine species, referred to *H. rugosula* by HOOKER, Sp. Fil. 4: 272.

Area of distribution: Taken in a wider sense, the species inhabits Australia, Chile, Juan Fernandez and probably also Tristan d'Acunha.

Adiantum L.

36. **A. chilense** Klf. Enum. 207 (1824); C. Chr. Ind. 24; Arkiv för Bot. 10: 4 (1910). — Syn. *A. aethiopicum*, Hemsl. 70; Johow 1893: 23 f. 5 a—c, 1896: 156 *non* L.

A very common plant, ranging from the sea coast to the highest ridges, found both in the forest region and on the open, barren slopes near the sea. With ripe sporangia in the autumn and winter.

Masatierra: In all the valleys from Pto Frances to Juanango (nos. 59, 59 b, 572).

Santa Clara: JOHOW.

Masafuera: Common along the shore from B. Toltén round the E. and S. coasts to Q. Lobería, especially under overhanging rocks (no. 446); also in the forest (no. 518) and in the alpine heath, to 1400 m.

All specimens examined belong to the genuine *A. chilense*, characterized by perfectly glabrous fronds. JOHOW described and figured three forms. Of these, the first (fig. 5 a) is a robust one, with a strong stipe, and the third a smaller one (fig. 5 c) with a slender stipe; surely they represent two local forms differing from humidity and shade. Both are represented in our collection.

The second variety of JOHOW (fig. 5 b) is remarkable by the pinnae being more or less striped with white, forming white sections of tissue without chlorophyll. Suggesting that they were due to some pathologic cause, Dr. H. E. PETERSEN on our request made microtome sections through such leaves and found that the cells of the white parenchyma were filled with an entangled mass of hyphae of a parasitic fungus that destroys the chlorophyll.

Area of distribution: Perú to Patagonia, Falkland Islands; Juan Fernandez.

Pteris L.

37. **P. chilensis** Desv. Berl. Mag. 5: 325 (1811); Hook. Sp. Fil. 2: 176 tab. 120 A; Hemsl. 70; C. Chr. Ind. 594; *non* Johow 1893 fig. 7 nec 1896: 156, saltem pro parte. — Syn. *P. tenera* Klf. 1824; Gay 6: 488 (*non* Bertero); *P. fernandeziana* Phil. Linnaea 29: 105 (1857), t. spec. orig. Herb. Mus. Nac. Santiago!

In humid forests, on soil rich in humus; not observed at a greater altitude than 500 m in Masatierra. (Fertile Dec.—April.)

Masatierra, not uncommon in the central part: C. Centinela, c. 400 m (no. 609); V. Anson, lower slopes of La Damajuana, 345 m (no. 216); V. Colonial, at the road to Portezuelo, in the maqui-thickets, 200 m (no. 566); Q. del Monte Maderugo, c. 500 m (no. 337); C. Salsipuedes, forest patch c. 400 m; Pto Ingles, on the central ridge (no. 324); south side of the island, slope of Co Chumacera (no. 252).

Masafuera: in the forest of the Sanchez plain, 515 m (no. 401); Q. de las Chozas, in the forest (no. 544); Q. de las Casas, under a large stone in the outer section of the gorge, rare.

The present species is nearly related to the South Brazilian *P. leptophylla* Sw., but still very distinct. Its rhizome is short creeping, rather stout, densely covered with dark brown, rigid, lanceolate scales, as is the larger part of the stipes, which rise close together. *P. fernandeziana* Phil. cannot stand even as a variety; the type of *P. chilensis* is quadripinnatifid, but some specimens, growing in deep shade, are barely tripinnate at base, and the lamina more open and thin, and they represent the true *P. fernandeziana*.

JOHOW's *P. chilensis*, as proved by his figures, description and specimens,

is = Histiopteris. Thus it is impossible to understand why he identified *P. fernandeziana* with his *chilensis*.

Area of distribution: South Chile, Prov. Maule to Valdivia; Juan Fernandez.

38. **P. semiadnata** Phil. Linnaea 29: 106 (1857); C. Chr. Ind. 607. — Syn. *P. flexuosa* Mett. Fil. Lechl. 1: 12 (1856) *non* Klf. 1830; *P. marattiaefolia* Hook. Sp. Fil. 2: 177 tab. 122 B (1858); Hemsl. 71; Johow 1893: 25, 1896: 197.

Characteristic of the foggy region above 500 m, in Masafuera also in the alpine heath, very local. (Fertile Jan.—April.)

Masatierra: Densely wooded, damp quebradas on the highest part of C. Centinela, c. 660 m (no. 613); C. Salsipuedes, Q. Helechos in *Drimys-Dicksonia*-forest, c 600 m, a beautiful stand (no. 280). — GERMAIN without locality.

***Masafuera:** Q. del Mono, c. 400 m (no. 543), forest ravine; Q. del Blindado, forest, 440 m; C. del Barril, rock crevices above 800 m; Q. Inocentes, under *Dicksonia* near the stream; the Correspondencia Camp, in the ravine 1160 m; edge of western precipice, at the foot of Las Torres among rocks, 1370 m (no. 438). — New for Masafuera.

The occurrence in the islands of this pretty, distinct species, recorded by HEMSLEY from specimens collected by GERMAIN, was doubted by JOHOW, who suspected the locality to be false. The question is now settled by the rediscovery of the species. The specimens are identical with those previously collected by SKOTTSBERG in the island of Huafo, perhaps with the sterile tips of the pinnules more grossly serrate, at least much more deeply and broadly serrate than shown in HOOKER's figure. The fertile edges are regularly crenate, often prolonged beyond the brownish green, continuous indusium, which generally is crenate with the crenae covering the nearly globose, rarely confluent sori, that arise from the tips of the veins. In the sori the species resembles *Cassebeera*, but the whole habit is that of *Pteris*. It is a very large plant. The base of the stipe is clothed with dark brown, opaque, lanceolate and entire scales.

We do not know any species of *Eupteris* nearly related to *P. semiadnata*. We cannot agree with METTENIUS in considering it »ex affinitate P. chilensis», but it resembles some large Andine species of *Litobrochia*, especially the Mexican *P. pulchra* Schlecht. We are of the opinion that the subgenera of *Pteris*, based solely upon the venation, are very unnatural, and that it is quite natural to associate the free-veined *P. semiadnata* with *P. pulchra* and its allies, which have anastomosing veins.

Area of distribution: South Chile, Valdivia to Isla Huafo; Juan Fernandez.

39. **P. Berteroana** Agardh, Rec. Gen. Pteridis 66 (1839); C. Chr. Arkiv för Bot. 10: 20 (1910). — Syn. *P. tenera* Bertero ex Colla 1836: 38 (t. Ag. *non* Kaulf.); *Litobrochia decurrens* Gay 6: 491 (ex. descr., *non* Presl); *Pteris comans* Hemsl. 70; Johow 1893: 25 f. 8, 1896: 257; *P. incisa* Johow 1893: 24 f. 6 (t. spec. orig.!).

Common in the forest belt from Pto Frances to Juanango, and ranging vertically from 200 to 640 m or more, in dense groves or in open glades along streams and cascades. (Fertile Dec.—March.)

Masatierra: C. Chifladores, quebrada in the interior of Pto Frances, c. 500 m, not uncommon; Q. Piedra agujeriada, c. 650 m; Pangal; Q. de la Damajuana, frequent at the small waterfalls, 250—350 m (no. 64, 217); near Plazoleta del Yunque, ca. 250 m (no. 64 B); V. Colonial, Q. del Monte Maderugo, 235 m; Cave no. V, rare; C. Salsipuedes, fern grove, 600 m; Q. Villagra, below the pass, c. 500 m, scarce; Q. de la Choza, in forest c. 250 m; S. slope of Co Chumacera, in a *Boehmeria*-patch.

Masafuera: Forest on the Sanchez plain, 515 m; fissures in the coast cliffs N. of Q. de las Casas, rare; more common in the canyon (no. 464); Q. del Blindado, in the forest, 440 m; Q. de las Vacas, in the gorge; Q. Lobería, at the stream and in the forest, c. 290 m.

This species cannot be united with *P. comans* Forst., but it is undoubtedly closely related to *P. Endlicheriana* Ag. from Norfolk Island, with which the older *P. Zahlbruckneriana* Endl. is probably identical. We know this species from HOOKER's Icon. Plant. tab. 973 only, and the specimens from Juan Fernandez are different in habit. The venation is as described by AGARDH; above the row of regular costal areoles the veins are free or form an irregular second row of smaller areoles, while, in *P. Endlicheriana,* there are four rows of areoles. The ultimate segments are also different in shape, longer and more lanceolate in *P. Berteroana.* In any case, this belongs to the Polynesian element in the flora.

Area of distribution: Endemic.

Histiopteris (Ag.) J. Sm.

40. **H. incisa** (Thbg) J. Sm. Hist. Fil. 295; C. Chr. Ind. 352. — Syn. *Pteris incisa* Thbg 1800; Hemsl. 70; Johow 1893: 24 (pro parte, *non* f. 6), 1896: 156 pro parte?; *P. flavescens* Colla 1836: 37 tab. 67; *P. patens* Kze Anal. 28 (1837); *Litobrochia patens* Gay 6: 490; *P. vespertilionis* Lab. var. *flavescens* Ag. Rec. 80; *H. incisa* var. *flavescens* C. Chr. Arkiv för Bot. 10: 14 (1910); *P. chilensis* Johow 1893: 24 f. 7, 1896: 156 (excl. syn.).

A characteristic fern of the open forests and clearings, also occurring in the barren tracts and forming extensive mats in burnt places. (Fertile Jan.—April.)

Masatierra: Ridge between the Laura and Piedra valleys, 500—600 m, along the edge of the forest; Pangal, in the dry outer sections of the gorges; clearing near Plazoleta del Yunque, copious; V. Colonial, lower slopes, in the small ravines (nos. 187, 583); Q. del Monte Maderugo (no. 333); Caves nos. I and X; Villagra, along the road from Portezuelo, very numerous in cleared spaces; S. slope of Co Chumacera; B. Chupones, rocky places, ravines, scarce.

Masafuera: Q. del Mono, c. 475 m (no. 519); Q. del Blindado, 440 m; Q. Lobería, near the stream, c. 190 m; highlands north of Q. Casas, seaward

face of Las Torres, among rocks, 1370 m; slopes of Los Inocentes, along the edge of the *Dicksonia*-forest, 950—1200 m; on the summit, 1350—1400 m.

A detailed comparison of our specimens with others from different regions has proved that the plant from Juan Fernandez cannot be distinguished from the South African type or from the Australian *P. vespertilionis* Labill. even as a variety. GAY distinguished two species, but it seems that his descriptions are abbreviated reprints from older works and not written after autopsy of specimens. AGARDH referred *P. flavescens* to *P. vespertilionis* Labill. as a variety, with the following differential characters: »fronde subtus glaucescente, stipite flavo» but specimens from Tasmania are also glaucous and the stipe of *P. flavescens* is not always yellow but frequently light castaneous and very glossy; nor do the differences between this and *patens* or *incisa* hold good.

The species varies in colour of stipe and rhachis, in the degree of cutting, bipinnate-tripinnatifid to tripinnate-quadripinnatifid, the more divided form well figured by COLLA. The lower side is pale green or subglaucous, the sori reaching from the base to near the obtuse tips of the segments or interrupted. The veins generally form a single row of costal areoles, but in one specimen we found them nearly free. As all these variations are also found in the South African or Australian plant we conclude that it is the typical form of *P. incisa* that has found its way to this isolated locality. The South American variety (*P. elegans* Sw.) looks rather different, and the Polynesian form (*L. sinuata* Brack.) is still more remotely related to it. In a single character some specimens recall *L. sinuata,* for the lower side is finely glandulose, quite as in specimens from New Caledonia, but this character is not a constant one, and, moreover, some few glands may be found also in typical *incisa.*

JOHOW has misunderstood the present species, as well as the species of *Pteris,* which is proved from his figures and also from the specimens in his herbarium.

Litobrochia appendiculata Gay 6: 491 war referred to *P. incisa* by HEMSLEY, and JOHOW states that a specimen so named in the Herb. Mus. Nac. Santiago no doubt belongs to *P. chilensis.* Now, *P. chilensis* Joh. is *Histiopteris.* We believe that this opinion is right.

Area of distribution: South Africa, Australia, Tasmania; Juan Fernandez.

Polypodium L.

*41. **P. Billardieri** (Willd.) C. Chr. Ind. 513. var. **magellanicum** (Desv.) C. Chr. Arkiv för Bot. 10: 15 (1910). — Syn. *Grammitis magellanica* Desv. Berl. Mag. 5: 313 (1811); *G. nana* Brack. U. S. Expl. Exp. 16: 1 (1854).

Rare. Fertile fronds occur at all seasons.

Masatierra, only in the humid elevated parts and only found growing on *Drimys Winteri:* high ridge between Q. Laura and Q. Piedra agujeriada, in dense forest 650 m (no. 597); on the main crest of the island, above Pangal, c. 800 m; mountain spur W. of el Yunque, c. 500 m, very scarce (no. 632).

Masafuera: C. del Barril, in moss-carpets on rocks, 985 m (no. 537).

The specimens of this species, for the first time collected in Juan Fernandez, agree perfectly well with the small form from Fuegia described as *G. nana* Brack., which is nothing but a dwarf form of *G. magellanica* Desv. In 1910 (l. c.) were pointed out the differences between the South American form and the typical *G. Billardieri* (*Pol. australe* R. Br.) from Australia, New Zealand etc., and it is a matter of convenience whether the two forms ought to be regarded as two separate species or as forms of a single one. We prefer the latter as the American plant is intimately related to the typical form, while, on the other hand, it has no near relative in South America. In any case it is an Antarctic element in the South American flora.

Area of distribution: Australia, Tasmania, New Zealand, Lord Howe's Island, Norfolk Island, Auckland and Campbell's Islands. South Chile; Valdivia to Fuegia; Juan Fernandez (var. *magellanicum*).

P. intermedium Colla 1836: 51 tab. 74. — Syn. *P. translucens* Kunze, Anal. pteridol. 16 (1837); Hemsl. 76 tab. 13; Johow 1893: 39 f. 23, 1896: 166 tab. 18; *Goniophlebium translucens* Fée, Gay 6: 509.

Colla's name must be preferred to Kunze's, being one year older; it is not invalidated by an earlier *P. intermedium* Willd. as erroneously stated in Ind. Fil. 570. In Willd. Spec. 5: 262 *P. intermedium* Mühlb. is quoted as a M.S. name only for *Aspidium intermedium* Willd.

This species is endemic, although Gay etc. also quoted Chile as its native country, for the specimens in Chilean herbaria belong to *P. synammia* (Fée). As mentioned by Hemsley and Johow it is very variable. The collection includes a series of varieties, of which three correspond to those figured by Hemsley. The extreme forms are so different that they can be mistaken for separate species, but they all have the essential characters in common, and a similar degree of variation is known in several species, e. g. in *P. vulgare*, the forms of which correspond in a remarkable way to those of the present species.

All forms have the same thick rhizome, densely covered with imbricate, peltate, ovate-lanceolate scales, which are dark reddish brown and thicker in the centre, paler and thinner at the margins and apex. The stipe is rather pale, glabrous, and distinctly articulated just above the base. Lamina deltoid, the pinnae connected by a narrow wing to the pale rhachis, the basal ones a little decurrent; surface glabrous, texture generally thin, margins hyaline or cartilagineous, veins very visible in their lower course, where they are dark-coloured, but becoming nearly invisible towards their tips. Costal areoles distinct, outside each areole 2—4 free veins, that do not reach the margin; for exceptions, see below. The areole includes a free veinlet, which bears a sorus at its apex; sometimes it is furcate. The receptacles are distinctly linear but short, the young sori oblong, a little immersed, the mature globose and superficial.

All forms show these characters: they differe in size, texture and degree of division.

Smallest leaves are 6 cm long and wide (stipe excluded), largest 24 cm long and wide; sometimes the lamina is broader than long. Typically it is

thinly herbaceous, but specimens growing on rocks (nos. 318, 1148) have a nearly coriaceous leaf with thick cartilagineous edges and the sori more distinctely immersed.

As stated above the species varies extraordinarily in the degree of cutting. The type, first described under the name *intermedium* (or *translucens*), is confined to Masatierra. Only once, an aberrant form was found growing on rocks (no. 318); this corresponds rather to var. *basicompositum* from Masafuera. When JOHOW states that in Masatierra the species shows »lamina pinada-tripinada», he must have drawn his conclusions from HEMSLEY's plate, for he never collected a much divided form in Masatierra. The plants figured by HEMSLEY fig. 2, 3 were collected by Mr. DOWNTON in »Juan Fernandez». They represent two Masafueran varieties and were undoubtedly collected in Masafuera, this island also having been visited by DOWNTON, and not in Masatierra, where they do not occur. Masafuera is inhabited by a number of forms connected by transitions. As they grow side by side, sometimes two widely distant ones on the same branch, it is impossible to regard them as merely results of local influences. Either, the species is composed of a number of units, elementary species, giving the impression of a more or less continuous series, or we have a few subspecies and their hybridogenous offspring. From taxonomic point of view we have found it advisable to distinguish the following phaenotypes.

1. **typicum.**

Endemic in Masatierra, not uncommon as an epiphyte on trees, generally high up above the ground. Fertile during the summer and autumn.

Masatierra: generally found on *Drimus Winteri,* but rarely below 400 m, e. g. on the ridge between Q. Laura and Q. Piedra agujeriada, c. 650 m; Rabanal, c. 450 m; Q. Damajuana, c. 250 m (rare), above 460 m fairly common; N E. slope of El Yunque (no. 154); C. Central, above 400 m; V. Colonial, the slope below the Portezuelo pass (no. 33); Q. Seca, c. 435 m; C. Salsipuedes, 670 m, and in Q. Helechos, 660 m; Pto Ingles (JOHOW).

Confined to Masatierra and well illustrated by HEMSLEY, tab. 63 fig. 1. Simply pinnate with pinnae connected by a narrow wing to the rhachis, their margins subentire or obscurely serrulate. Veins always forming regular costal areoles, often dark. In general habit resembling large forms of the Mediterranean *P. vulgare* subsp. *serratum.*

An aberrant rock form corresponds to var. **basicompositum** described below: minor, coriacea, pinnis basalibus pinnatis. — Fig. 6 *d.*

Masatierra: Pto Ingles, two small specimens grew on the outside of the »Robinson grotto» (no. 318). We are not sure if this form is to be considered as a variety of *typicum,* growing on rocks, but we find it more probably that it ought to be referred to var. *basicompositum* of the Masafueran subspecies; in Masafuera, also another variety was found growing on rocks. It very likely offers an example of occasional dispersal of spores from Masafuera to Masatierra, where no forms of subsp. *masafueranum* occur.

2. subsp. **masafueranum** C. Chr. et Skottsb. nov. subsp.
Fig. 6.

Fig. 6. *Polypodium intermedium* Colla subsp. *masafueranum* C. Chr. et Skottsb. *a* var. *obtuseserratum* (no. 431); *b* var. *basicompositum* forma, with regular areoles (no. 1181); *c* var. *basicompositum* forma, with free veins (no. 1186); *d* form from Masatierra, corresponding to *basicompositum* (no. 318); *e* var. *cambricoides* (no. 432) with areoles or free veins. — All plants half nat. size.

A typo differt pinnis basi magis angustatis, margine distincte dentato-serratis vel grosse obtuse-serratis, interdum pinnis plus minus pinnatifidis, basalibus compositis, rhachide angustissime alata.

Fig. 6.

*Endemic in Masafuera. All forms seem to differ from the type by their pinnae being more narrowed towards the base, and by the nearly unwinged rhachis. We distinguish the following varieties. All of them are epiphytic on trees, mostly on *Myrceugenia Schulzei,* only once a form has been observed growing on rocks. All forms were seen with ripe sporangia (Feb.—March).

var. **obtuseserratum** C. Chr. et Skottsb. nov. var.

Frons plerumque haud magis quam in typo divisa, sed pinnae multo distinctius serratae vel lobulatae, serraturis vel lobis sat irregulariter dentatis; pinnae basales breviores, rarius basipinnatae. — Fig. 6 *a*; HEMSLEY Fig. 2.

Masafuera: Forest on the Sanchez plain, 515 m, growing in company with the following forms (no. 527). Q. del Mono, 450—570 m (no. 1182); Q. del Blindado; Q. Lobería, 280 m, in forest (no. 431) and below the forest, in the gorge, on rocks (f. *coriacea*, no. 1148).

Generally not more divided than the type, but the pinnae, often considerably narrowed towards the base, are much more deeply serrate, the serratures again irregularly dentate, or cut more than halfway down to the midrib into oblique, repand or serrate lobes, the basal ones shorter or obsolete; sometimes the basal pair of pinnae produces one or two longer lobes on the lower side, or, more rarely, on the upper side, thus forming a transition to the following variety. Veins of the lobes often free but not seldom forming one or two areoles.

var. **basicompositum** C. Chr. et Skottsb. nov. var.

Pinnae basales regulariter et profunde pinnatifidae segmentis elongatis; pinnae superiores ut in praecedenti vel interdum suprabasales segmentis 2—3 longis instructae.

Fig. 6 *b, c*; HEMSLEY Fig. 3.

Masafuera: Forest on the Sanchez plain, 515 m (no. 1181); Q. del Mono, 570 m (no. 1186); Q. de las Casas, on a tree fallen down from the wall of the canyon (no. 529).

Basal pinnae regularly and deeply pinnatifid with lengthened segments on both sides; upper pinnae as in the preceding form, but sometimes the second pair of pinnae produces two or three long segments. The basal upper segment of basal pinnae short or often quite rudimentary.

var. **cambricoides** C. Chr. et Skottsb. nov. spec.

Plerumque maxima, tripinnatifida. Frons flaccida textura tenuis. Pinnae usque ad costam alatam incisae, pinnulis basalibus superioribus ad dentem axillarem reductis. Pinnulae pinnarum superiorum profunde et distanter obtuse-serratae, illae inferiorum pinnatifidae segmentis tertiis repandis vel obtuse serratis.

Fig 6 *e*.

Masafuera: Forest on the Sanchez plain, 515 m (no. 540); Q. del Mono, 450—570 m (no. 432); Q. del Blindado.

Generally large, bipinnatifid. All pinnae incised to a narrow wing into long secondary pinnules, the upper basal ones being reduced to a tooth in the axil of the costa. Pinnules of upper pinnae deeply and distinctly serrate, resembling the upper pinnae of var. *obtuseserratum,* those of the lower pinnae again pinnatifid with repand or obtusely serrate tertiary segments. Veins in ultimate lobes free or also forming a single areole, rarely dark. Texture mostly very thin, the lamina flaccid. This form corresponds to the var. *cambricum* of *P. vulgare*, although somewhat more divided.

Area of distribution of *P. intermedium:* Endemic.

43. **P. pycnocarpum** C. Chr. Ind. 557. — Syn. *P. macrocarpum* Presl, Rel. Haenck. 1: 23 tab. 1 f. 24 (1825), *non* Bory; Johow 1896: 167. *P. masafuerae* Phil. Linnaea 29: 107 (1857); Hemsl. 77; Johow 1893: 38; *P. squamatum* Phil., *P. atacamense* Bak.

Masafuera: GERMAIN!

Only a single, badly dried specimen is known, now in the Mus. Nac. in Santiago; it was collected in Masafuera by GERMAIN and was described by PHILIPPI as a new species. The impossibility of refinding it made it rather improbable that it should be an endemic species. After an examination of the original plant we have arrived at the conclusion that JOHOW was right in naming it *P. macrocarpum,* an Andine species. The single plant found perhaps grew from a spore brought from the Andes with a strong northerly wind, just as the curious occurrence of *Elaphoglossum,* mentioned below, may be explained. JOHOW suggested that *P. atacamense* Bak. (= *squamatum* Phil.) from the Atacama desert would be a more xerophilous form of the same species; thanks to Dr. O. STAPF, who sent us a leaf of the type, we are able to confirm JOHOW's opinion. It is not nearly related to *P. plebejum* Ch. et Schl., as thought HEMSLEY.

Area of distribution: Mexico to Chile and Argentina; Masafuera.

44. **P. lanceolatum** L. Spec. Pl. 2: 1082 (1753); Hemsl. 76; Johow 1893: 36; C. Chr. Ind. 537. — Syn. *P. peltatum?* Colla 1836: 52 *non* Cav.; *Drynaria elongata* Fée, Gay 6: 512; *Gymnogramme elongata* (Hemsl. 77?), Johow 1893: 38 f. 24, 1896: 168.

A rather common epiphyte, also in the thin woods, generally found on *Drimys Winteri* and often in company with *P. intermedium;* rarely terrestrial. (Fertile Dec.—April.)

Masatierra: Pto Frances, c. 250 m (no. 129); ridge between Q. Laura and Q. Piedra agujeriada, c. 650 m; Rabanal, frequent in the interior; C. Centinela, on the ground in a shallow depression of the ridge not far south of the Radio station; higher up a common epiphyte (no. 1150); Pangal (JOHOW); Q. de la Damajuana, c. 250 m (no. 62); V. Anson, on the slopes of La Damajuana (no. 215) and of El Yunque, common above 400 m; V. Colonial, along the road to Portezuelo (no. 32); Q. Seca, c. 435 m; C. Salsipuedes, Q. Helechos, 660 m.

Masafuera: Forest on the Sanchez plain, 515 m; Q. del Mono, 475 m

(no. 1183); Q. de las Casas, growing on the rocky wall not far from the entrance; and also found in the canyon on a fallen tree (no. 546).

All the numerous specimens collected belong to the genuine *P. lanceolatum* and no form seen can with any right be placed under *Gymnogramme elongata* (Sw.) Hook. HEMSLEY says that the subspecies had been collected once but that he had not seen specimens. JOHOW had two species in 1893; in 1896 he merges *P. lanceolatum* into *Gr. elongata,* evidently unaware of the differences between the two types. It seems certain that only one form occurs in the islands, and, therefore, *G. elongata* must be excluded form the list.

Some of the specimens are very large (leaves 25 cm long by $2^1/_2$ cm wide) and several have the edges of the upper part sinuate. No. 32 includes several frond with the tips once or twice furcate or cleft into three lobes.

Area of distribution: Pantropical; also in Chile.

Elaphoglossum Schott

*45. **E. Lindenii** (Bory) Moore. C. Chr. Ind. 310. — Syn. *Acrostichum Lindenii* Bory; Fée Acrost. 48 tab. 18 f. 3.

Masatierra: north precipice of Co Pirámide, c. 600 m, among mosses on a narrow ledge; very few specimens seen (no. 193).

A most interesting addition to the flora of the islands. The few plants found agree in all details with the Mexican form described as *Acrostichum venustum* Liebm. A possible explanation of the occurrence of this species in the islands is given under *Polypodium pycnocarpum* above; the mountain wall where it was found faces the North and will be struck by the rare but strong northerly storms.

Area of distribution: Tropical America; Masatierra. Not in Chile.

Gleicheniaceae.

Gleichenia Smith

While HEMSLEY listed two species of Gleichenia, *G. cryptocarpa* Hook. and *G. revoluta* H. B. K., evidently overlooking that HOOKER in Syn. Fil. 13 quoted the locality »Juan Fernandez, Bertero», for *G. pedalis* (Klf.) Spr., JOHOW's list contains only *G. pedalis,* as he believed that both species listed by HEMSLEY were incorrectly named and only represented *G. pedalis.* In this he is quite right: *G. cryptocarpa,* quoted on the authority of PHILIPPI (Bot. Zeit. 1856: 631) is shown by the specimens in Mus. Nac. Santiago to be *G. pedalis* (they were thus labelled by PHILIPPI himself), and Mr. WRIGTH kindly informs us that DOWNTON's specimen of *G. revoluta* in the Kew Herbarium is *G. pedalis* and that MOSELEY's fragmentary plant also belongs to the same species. Thus, only one species of the genus was hitherto known from the islands.

*46. **G. quadripartita** (Poir.) Moore, Ind. 382 (1862); C. Chr. Ind. 324.

Only in the Alpine region, in sheltered places. Rare. (Fertile Feb. March.)

Masafuera, in the highest parts: The Correspondencia Camp, in the ravine, 1160 m (no. 409); Las Torres, 1370 m; C. del Barril, 1290 m; Los Inocentes, 1375 m. — New for Juan Fernandez.

The specimens agree closely with an authentical specimen leg. COMMERSON, Herb. Haun. The primary branches are sometimes once, sometimes twice furcate. Younger leaves decidedly glandulose, especially beneath.

This species is often confounded with *G. cryptocarpa* Hook., but it is not proliferous although having a scaly bud in the primary furcation; the costae and costules are rather densely chaffy with rufous scales and flaccid hairs, the edges revolute but not covering the sporangia, and the slender, branched rhizome is very sparingly paleaceous with ovate, peltate, appressed, very deciduous scales, while the rhizome of *G. cryptocarpa* is stronger and more densely and permanently paleaceous.

Area of distribution: Llanquihue to Fuegia; Masafuera.

47. **G. pedalis** (Kaulf.) Spr. Syst. 4: 26 (1827); Johow 1893: 20 f. 1, 1896: 153. — Syn. *Mertensia pedalis* Kaulf. Enum. 39 (1824).

Rocky ridges in dry, sunny places, very local. (Fertile in March.)

Masatierra: V. Colonial, near the road to Portezuelo, 3—400 m, forming small beds in places (no. 563); C. Central, on the narrow crest, 570 m; C. Salsipuedes, narrow ridge between Q. Salsipuedes and Q. Helechos, c. 500 m, Q. Villagra, low ridge near the camping place, c. 200 m.

The specimens are rather typical, still the costa and costules are perfectly destitute of scales; both surfaces are finely glandulose by minute, glistening glands.

Area of distribution: Cordilleras of Southern Chile; maritime provinces from Valdivia to the Chonos Islands; Masatierra.

*48. **G.** cf. **litoralis** (Phil.) C. Chr. Ind. 322.

Masafuera: The Correspondencia Camp, in the ravine, very scarce (no. 403.)

Sterile specimens from Masafuera that resemble *G. pedalis* in colour, veins, structure of scales and growth, but differ in its palaceous costae and costules; the scale are rufous, paler with age, ciliate, those of the costules lacerate, small, all leaving small red spots when falling; it also differs in the shape of the segments, which are broader below, gradually tapering toward the apex and finally in the primary branches being twice furcate, carrying segments above quite to the base, naked outwards from the first to the second furcation. Typical *G. pedalis*, as a rule, has the primary branches prolonged without segments on both sides save for a larger one close to the furcation. After inspection, Prof. HIERONYMUS informs as that it stands near *litoralis* of Philippi, which has narrower scales on the midrib.

Ophioglossaceae.

Ophioglossum L.

*49. **O. fernandezianum** C. Chr. nov. spec.

Rhizoma parvum, 3—4 mm latum, hypogaeum, radiculas numerosas brunneas emittens. Folia saepe bina. Petiolus communis hypogaeus, tenuis, pallidus, compressus, rarius ad 2 cm longus. Lamina sterilis petiolo hypogaeo 0,5—1,5 cm longo, pallido, complanato, ovata, 1,5—2,5 cm longa, paulo supra basin rotundatam 10—14 mm lata, apiculata, carnosula. Vena mediana in-

Fig. 7. *Ophioglossum fernandezianum* C. Chr. *a, b* two plants, × 2; ... marks the surface of soil; *c* leaf, × 4, showing venation.

distincta, quam laterales vix crassior, interdum subnulla; areolae magnae. Vitta deest. Pedunculus spicae lamina sterili brevior vel subaequans, fere ad apicem hypogaeus et pallidus. Sporangia 7—10-juga, apice sterili spicae ovato-acuto.

Masatierra: In the western part, slopes towards B. Tierras Blancas, c. 50 m (BÄCKSTRÖM; no. 1126). — Fertile.

In the summer, no trace of this plant was seen; in the spring, when Mr. BÄCKSTRÖM returned to Masatierra, he found this species (Aug., 1917).

This new little species certainly falls within the aggregation of forms called *O. nudicaule* by BAKER, but it cannot be referred to any species described by PRANTL in his monograph of the genus. It mostly resembles *O. ypanense* Mart. from Brazil and Columbia, but it lacks the »vitta», the pale

stripe along the middle of the sterile lamina. From all species known to us it seems very well marked by the long shaft of the sterile lamina and by the short peduncle, which scarcely and rarely overtops the sterile lamina. The whole common stalk as well as the stipe of the sterile lamina and nearly the whole peduncle of the spike are, at least in all specimens collected, hypogaeus and without chlorophyll. The venation is seen in fig. 7 *c*, drawn by Mag. MATTHIESEN.

Area of distribution: Endemic in Masatierra.

Lycopodiaceae.

Lycopodium L.

*50. **L. magellanicum** Sw. Syn. Fil. 180 (1806).

Only in the alpine heath, rare. Fertile in the autumn.

Masafuera: In the higher parts of the Alpine region, Las Torres, c. 1350 m, scarce (no. 482). — New for Juan Fernandez.

A very robust form, with deeply subterraneous rhizome, larger than any form we have seen from Subantarctic districts.

Area of distribution: South Chile, Valdivia to Fuegia and Patagonia; Atl. subantarctic islands; Masafuera. New Zealand and subantarctic islands.

51. **L. Gayanum** Remy; Gay 6: 545.

Subalpine and alpine heaths. Fertile in the autumn and winter.

Masafuera: Stony heath in the highlands above the Mono and Pasto valleys, 1100—1300 m, not uncommon (no. 416); C. del Barril, 740 m (no. 534). — Discovered by SKOTTSBERG 1908, at the Correspondencia Camp.

BAKER, Fern Allies 29 regards *L. Gayanum* as intermediate between the typical *L. scariosum* Forst. from New Zealand and its var. *Jussiaei* Desv. from tropical America. We prefer to regard it as specifically distinct from both.

Area of distribution: South Chile, Valdivia to the Guaitecas Islands; Masafuera.

Before the investigations of SKOTTSBERG, the known vascular cryptogams of Juan Fernandez numbered 39 species; in 1908 3 species were added, and in 1916—17 9 more, giving 51 species as a total. Of these 36 species are common to Masatierra and Masafuera, 6 only found in Masatierra and 9 only in Masafuera. Of the 51 species 17 are endemic in the islands (3 of these confined to Masatierra and 1 to Masafuera). Two species are known elsewhere, but represented by endemic varieties. Of the genera only one, *Thyrsopteris*, in endemic. The percentage of endemic species is high, amounting to 33,3 %.

Explanation of the Plates.

All figures reproduced after photographs taken by C. Skottsberg.

Plate 1. 1. *Hymenoglossum cruentum* (Cav.) Presl on the slope of La Damajuana, Masatierra. *Asplenium magellanicum* Klf. in the centre and on the left side. 2. *Asplenium macrosorum* Bert. in Q. de las Chozas, Masafuera.

Plate 2. *Dicksonia Berteroana* (Colla) Hook. var. *virgata* C. Chr. et Skottsb. in Q. del Blindado, Masafuera. Mrs. S. at the foot of the tree.

Plate 3. *Dryopteris inaequalifolia* (Colla) C. Chr. near Portezuelo, Masatierra.

Plate 4. *Blechnum cycadifolium* (Colla) Sturm near the road to Portezuelo, Masatierra. Mrs. S. in the foreground.

Plate 5. *Blechnum longicauda* C. Chr. in Q. de las Casas, Masafuera.

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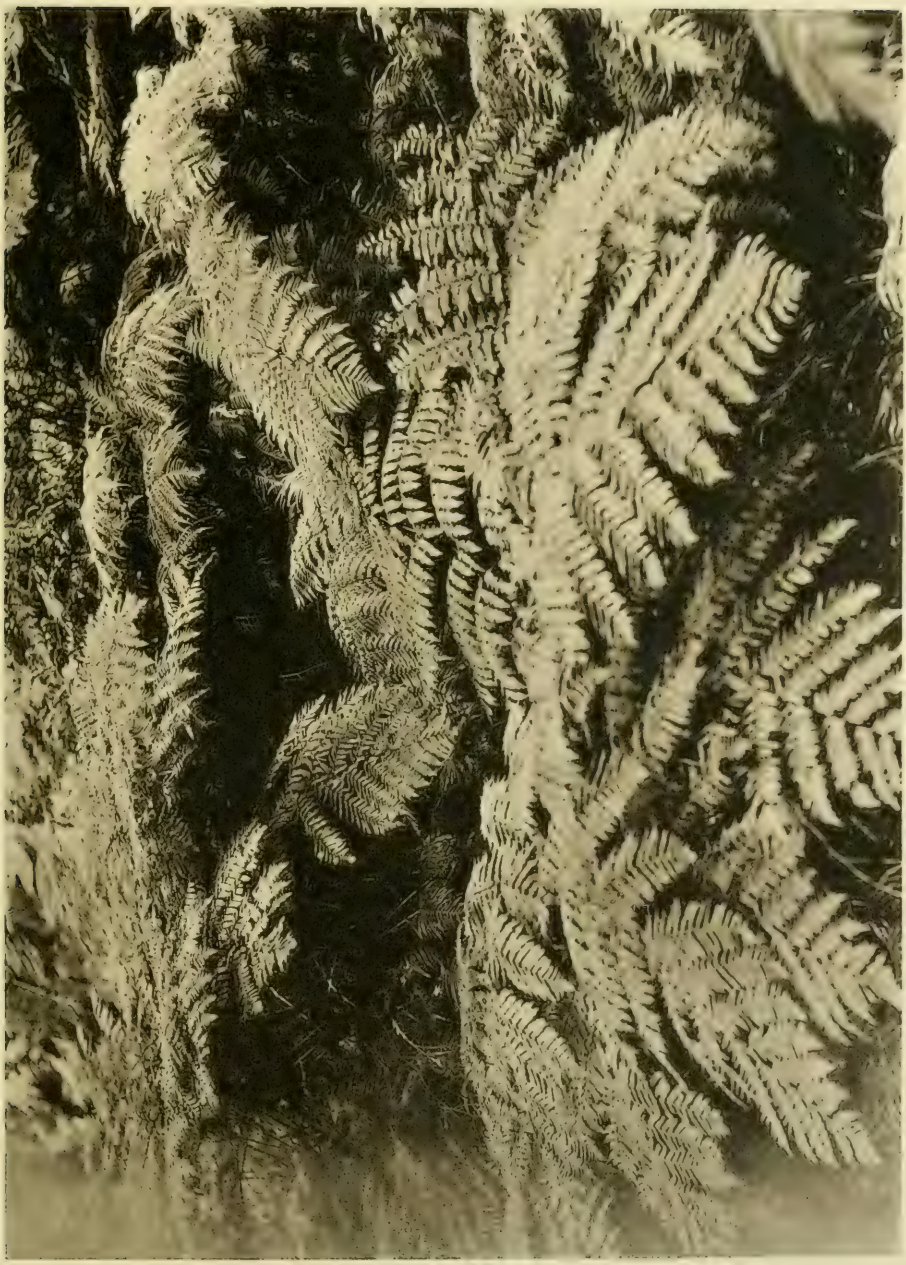

Lith. A. B. Lagerström & Westphal, Stockholm

2. The Ferns of Easter Island.

By

CARL CHRISTENSEN and CARL SKOTTSBERG.

With 3 text figures.

The present collection was made by the undersigned, assisted by Mrs. SKOTTSBERG, during the Swedish Expedition to the Pacific, 1916—17. We spent the later half of June, 1917, on Easter Island (Isla de Pascua). Before our visit, only one representative collection[1] seems to have been made on the island, by Mr. F. FUENTES of the Museo Nacional in Santiago, 1911; this was kindly put to my disposal in the said Museum. A list of Mr. FUENTES' ferns was published by C. M. HICKEN: Contribución al Estudio de las Pteridófitas de la Isla de Pascua i descripción de dos nuevas especies (Bol. Mus. Nac. Chile V: 1, 1913); also in Rev. Chil. Hist. Nat. XVII (1913). The ferns were also included in FUENTES' Reseña botánica sobre la Isla de Pascua (Inst. Centr. Meteor. y Geofís. de Chile no. 4, 1913 and Bol. Mus. Nac. Chile V: 2, 1913). FUENTES' list contains three species, not mentioned by HICKEN, *Asplenium obtusatum*, *Dryopteris parasitica* and *Polystichum aculeatum;* Mr. HICKEN, consequently, did not receive specimens of these. We did not find *P. aculeatum* or any allied species, nor were there any specimens of it in the collection shown to me by Mr. FUENTES.

In the short list of plants communicated by HEMSLEY (Report Challeng. Bot. I: 15) no fern figures.

Dr. CHRISTENSEN kindly undertook to revise our collection and the new forms described are due to him.

A map of the island, showing the localities quoted, is published in Vol. I, No. 1. — Altitudes in meters above sea level.

An* before a name signifies an addition to the flora.

The numbers in brackets refer to our collection.

C. Skottsberg.

Polypodiaceae.

Asplenium L.

*1. **A. adiantoides** (L.) C. Chr. Ind. 99 var. **squamulosum** nov. var.

A forma typica differt: foliis utrinque ad rachidem venasque dense paleaceis; paleis rhachidis fuscis, venarum minutis, e basi lata fimbriata subito in apicem subulatum angustissimum contractis.

[1] Nothing has been published on the »Albatross» collection (AGASSIZ a. o.).

Hab. in the crater lake of Rano Kao, c. 110 m., growing on the firm moss peat (no. 677; also AGASSIZ!). — Fertile. — Not recorded before.

Area of distribution: Asia, trop. Australia, New Zealand, Polynesia, Afr. orient. and adj. islands.

2. **A. obtusatum** Forst. — FUENTES, Bol. 327.

Rocks near the sea shore, probably not uncommon.

Hab. Estern headland, humid fissures on the steep slopes of Vaintu Rova, c. 275 m; Hanga Ho Orno, coast cliffs (no. 633); between Hanga Piko and Pta Baquedano, not uncommon, well developed. — Fertile.

Area of distribution: West coast of South America to Chiloé; Australia, New Zealand, Oceanic Islands.

Doodia R. Br.

*3. **D. paschalis** nov. spec. Fig. 1.

Rhizomate obliquo, brevi, paleis nigris, filiformibus cum parte basali stipitis subdense onusto. Stipitibus fasciculatis, strictis, parce scabris vel sublaevibus, a basi ad medium atris vel nigrescentibus, sursum pallide stramineis vel fuscis, basi paleis filiformibus crinitis, sursum glabris, superne late sulcatis instructis, ad 15 cm longis. Lamina pinnatifida, oblanceolata vel rarius subgradatim attenuata, versus basin subito contracta, ima basi saepe hastata, versus apicem breve caudata, usque ad 30 cm. longa, supra medium 6—10 cm lata, papyracea vel subcoriacea, obscure viridi; rhachide et costa mediana straminea, minuto glanduloso-pubescente, superne compressa, late canaliculata; pagina superiore glabra, inferiore minuto glanduloso-pubescente, postea glabra. Segmentis usque ad 30-jugis, approximatis, basi confluentibus, oblongis, obtusis, maximis 3,5—5 cm longis, 6—8 mm latis, marginibus inaequaliter argute serratis, inferioribus 3—5-jugis subito contractis, semiorbicularibus vel triangularibus sub 1 cm. longis, infimis frondium perplurimum elongatis, 2—2.5 cm longis. Venulis extus seriem areolarum costalium plerumque furcatis, in dentes abeuntibus. Soris nervo mediano valde approximatis, brevissimis (1—15 mm longis), plus minusve lunatis, utroque latere costæ uniseriatis; rarius secunda series interrupta primæ approximata adest. Indusiis integris, angustis.

Hab. Eastern headland, humid fissures on the steep slopes of Vaintu Rova and Tea-tea (no. 655); Rano Aroi, rocks inside the crater, c. 420 m, rare. — Fertile. — A new addition to the flora.

This new species is closely allied to *D. blechnoides* A. Cunn. from Australia, at least the plant cultivated under that name and accurately figured by METTENIUS (Fil. Lips. tab. 6 fig. 3—4), but BAKER (Syn. Fil.) says that the genuine *D. blechnoides* does not show the reduced lower pinnæ of our species. METTENIUS' description covers our plant very well with the exception that young *D. paschalis* is rather densely glandulose beneath, and that, in larger leaves, there are traces of a secord series of sori. Remarkable is the pair of lengthened basal pinnæ which make the whole lamina hastate; sometimes only one of the two pinnæ is long, rarely both are abbreviated. From the common Polynesian *D. media* R. Br. and its numerous forms *D. paschalis* differs in its pinnæ being contiguous at base, in the sori being placed close to the midrib, and in the furcate veins outside the costular areoles.

Area of distribution: Endemic.

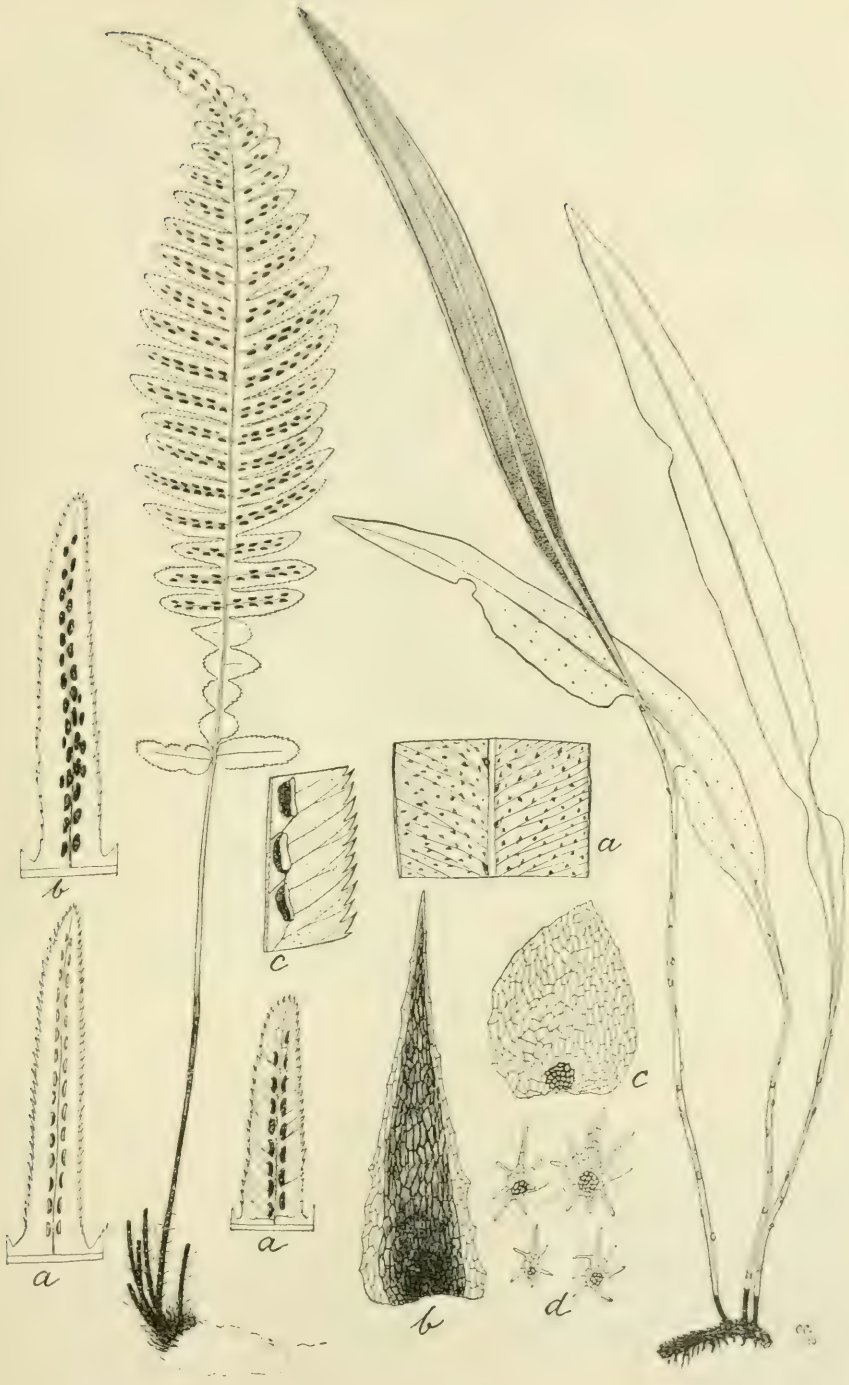

Fig. 1. Fig. 2.

Fig. 1. *Doodia paschalis* C. Chr.; entire frond, half natural size; *a* 2 pinnae from different specimens, nat. size; *b* pinna with partly double rows of sori, nat. size; *c* fragment of pinna, × 2.

Fig. 2. *Elaphoglossum tahitense* Brack.; entire plant, half natural size; *a* fragment of frond, nat. size; *b—d* paleae, *b* from the rhizome, *c* from the stipe, *d* from lower side of leaf, all enlarged.

Dryopteris Adans.

4. **D. Espinosai** Hicken, Bol. 135, tab. XXVII, Rev. 94, tab. 9. — Fig. 3.

Hab. Only found in the crater of Rano Aroi, c. 420 m, between large boulders (no. 690). — Fertile.

This species, recently described and figured by HICKEN after specimens collected by FUENTES, is a very remarkable one, belonging to the subgenus *Eudryopteris* which is very weakly represented in Central Polynesia but rather rich in species in the Hawaiian Islands. *D. Espinosai*, however, differs greatly from all Polynesian and Asiatic species of that subgenus known to us, while, on the other hand, it is closely related to a group of Tropical American species (*D. patula, cinnamomea* and *mexicana*). In most features it agres very well with *D. mexicana* (Pr.) C. Chr. (syn. Aspidium flaccidum), being, however, much larger, and with certain forms of the Brazilian *D. patula* (Sw.) Underw. It differs from these especially in the glandulose-ciliate basal scales and in the very glandulose lamina. As the original description was published in two periodicals rather rare in Europe, a full description is given below.

Rhizomate obliquo cum parte basali stipitum paleis lutescentibus vel pallide rubro-brunneis tenuissimis, lanceolatis, apice longe filiformibus, marginibus glandulosis, dense obtecto. Stipitibus fasciculatis, stramineis, ad 15 cm longis. Lamina textura tenuissima, laete virescente, ubique dense glandulosa, deltoidea — ovata vel ovato-lanceolata, circiter 20 cm longa, maxima 20 cm. lata, triquadripinnatifida. Pinnis saepe fere oppositis, distantibus, ovatis vel ovato-lanceolatis, maximis 10 cm longis, breve stipitatis, acuminatis vel subobtusis, infimis parum inaequilateralibus, latere basiscopico vix aucto. Pinnulis secundi ordinis inferioribus liberis, superioribus decurrenti-confluentibus, fere ad basin pinnatifidis, segmentis tertiariis decurrentibus, integris, crenato-dentatis vel maximis subpinnatifidis. Venis medianis basi decurrentibus, ultimis indivisis vel interdum furcatis. Soris majusculis, saepe uno pro lobo ultimo, nervo mediano approximatis. Indusiis reniformibus, subpersistentibus.

Area of distribution: Endemic.

*5. **D. gongylodes** (Schkuhr) OK.

Hab. Rano Aroi, c. 400 m, edge of the crater lake with *Polygonum acuminatum*, very scarce; Rano Kao, bottom of crater, c. 110 m, in the Scirpetum, and among the large boulders a little higher up (no. 678). — Fertile. — Not recorded before.

Area of distribution: Pantropical.

6. **D. parasitica** (L.) OK. — FUENTES, Bol. 327.

Hab. Crater of Rano Aroi, c. 420 m, and also crater of Rano Kao, c. 125 m (no. 666), among boulders. — Fertile.

This is taken in a wide sense; probably *D. parasitica* includes several distinct species.

Area of distribution: Tropical and subtropical regions.

7. **Elaphoglossum tahitense** Brack. — Syn. *E. Gayanum*, Hicken Bol. 137, Rev. 96. *non* Moore. — Fig. 2.

Hab. Fissures in the rocks in Rano Aroi, c. 420 m (no. 691). — Fertile.

The specimens collected agree in all essential characters with the description of BRACKENRIDGE; previously, it was known only from Tahiti. It is a much larger species than *E. Gayanum* (Fée) Moore, to which the specimens in the FUENTES collection were referred by HICKEN; moreover, it is well marked by the scattered minute scales on the underside.

Area of distribution: Tahiti; Easter Island.

Fig. 3. *Dryopteris Espinosai* Hicken; basal pinna, natural size; *a* pinnule of 1. order, × 2, *b* of 2. order, × 4.

Microlepia Presl

8. **M. strigosa** (Thbg) Presl. — HICKEN Bol. 132, Rev. 90.

The only common fern, probably growing all over the island in scattered specimens, generally among rocks and stones.

Hab. Eastern headland, Vaintu Rova and Tea-tea; plains near Hanga Ho Orno, not rare (no. 647); Rano Aroi, fairly common; between Hanga Roa village and Mataveri, scattered; Rano Kao, in the crater, not rare (no. 1125). — Fertile.

Area of distribution: SE. Asia, Polynesia.

Polypodium L.

9. **P. phymatodes** L. — Syn. *P. phymatodes* et *P. Fuentesii* Hicken, Bol. 132 tab. XXVI, Rev. 91 tab. 8.

Hab. Eastern headland, Vaintu Rova and Tea-tea, humid fissures, not rare (no. 654); Rano Aroi, fairly common; Rano Kao, stone-heaps near the lake, c. 125 m (no. 673), but also seen higher up. — Fertile.

This common Polynesian fern varies in the island as in most other localities greatly in size and division, the leaves now being entire, now trifid or pinnatifid with several pair of segments, which are longer or shorter, acute or obtuse. *P. Fuentesii* is one of the larger forms, but certainly not distinguishable even as variety. Typical *Fuentesii* is in the collection.

Area of distribution: The tropics of the Old World, including Australia and Polynesia.

Vittaria J. Sm.

10. **V. elongata** Sw. — Syn. *V. costata* Hicken Bol. 137, Rev. 96, *non* Kunze.

Hab. In fissures between blocks, with moss, in the craters of Rano Aroi, c. 420 m and Rano Kao, c. 125 m. (no. 672), in the last mentioned also in the moss peat of the crater lake. — Fertile.

This very common Polynesian species is totally different from the American *V. costata* Kze, to which HICKEN referred specimens from the island.

Area of distribution: Tropical Asia, Polynesia, N. S. Wales.

Ophioglossaceae.

Ophioglossum L.

*11. **O. reticulatum** L.

Probably not uncommon in short grass on the plains and slopes.

Hab. West slope of Mt Katiki (no. 1184); near the landing-place in Hanga Ho Orno (no. 648); near Mataveri; also seen in the centre of the island. — Fertile. — Not recorded before.

Area of distribution: Tropical Africa and America; Polynesia.

*12. **O. coriaceum** A. Cunn.

Hab. With the preceding, slope of Mt Katiki (no. 651), and at Hanga Ho Orno. — Fertile. — Not recorded before.

We have some doubt of this being the true *O. coriaceum* A. Cunn.; it certainly belongs to *O. coriaceum* Prantl, Mon. Ophiogl. 314 tab. 7 fig. 9, 10, 15; on the other hand, it falls under *O. vulgatum* var. *australasicum* Luerss. Mus. Godeffr. 3: 246, corresponding closely to his fig. 73. PRANTL refers LUERSSEN's variety to *O. pedunculosum;* to this species our specimens certainly do not belong.

Area of distribution: Australia, Tasmania, New Zealand; Easter Island; Bolivia.

If we exclude the dubious record of *Polystichum aculeatum*, Mr. FUENTES' list comprises 7 species (Polypodium Fuentesii was reduced to P. phymatodes), which were all found by us with addition of 5 species not recorded before, making a total of 12 ferns known in Easter Island. Two of these are endemic.

3. Die Myxomyceten der Juan Fernandez-Inseln.

Von

ROB. E. FRIES.

Die von Dr. C. SKOTTSBERG 1916—17 auf den Juan Fernandez-Inseln zusammengebrachte Myxomycetensammlung, die mir gütigst zu Bearbeitung anvertraut worden ist, umfasst insgesammt 16 Arten. Alle diese sind für die Inselgruppe neu, mit Ausnahme von zwei Arten, die laut JOHOW (Flora de las Islas de Juan Fernandez (1896) S. 195) schon dort angetroffen sind. Noch zwei, von SKOTTSBERG nicht gesammelt, werden daselbst angeführt. Insgesammt sind also 18 Arten von der Inselgruppe bekannt, eine (*Licea Schoenleinii;* siehe unten) jedoch sehr unsicher. Alle diese sind von der Insel Masatierra bekannt, nur drei derselben ausserdem von Masafuera.

Diese von Juan Fernandez bisher bekannten Myxomyceten, über welche ein Verzeichnis hier mitgeteilt wird, bilden sicherlich nur einen kleineren Teil der dort vorkommenden Arten. Sie bieten allerdings ein grosses Interesse dar, weil sie deutlich zeigen, dass die Myxomycetenflora gar nicht denselben Reichtum endemischer Arten wie die der höheren Pflanzen aufweist. Im Gegensatz sind, wenn man von der sehr unsicheren, JOHOWschen *Licea*-Art absieht, alle ausgeprägte Kosmopoliten. Um dies zu beleuchten dürfte es genügen zu erwähnen, dass von den 17 guten Arten nicht weniger als 13 sowohl aus Europa, Asien, Afrika, Australien als Nord- und Südamerika schon bekannt sind, die übrigen 4 aus wenigstens Europa, Asien und Nordamerika.

Ceratiomyxa fruticulosa (Muell.) Macbr.

Von JOHOW unter dem Namen *Ceratium hydnoides* Alb. & Schw. für Masatierra angegeben.

Physarum cinereum (Batsch) Pers.

Masatierra: Südwestseite von Portezuelo, im Wald ungef. 500 m ü. M. (10. Jan. 1917).

Die Exemplare gehören der Form an, die von G. LISTER (Monograph of the Mycetozoa. Ed. II. S. 73. 1911) als *cinereum* in beschränktem Umfang aufgefasst wird. Die Sporen sind nämlich hell braun, glatt, grösstenteils 8—9 μ Diam. Sie variieren jedoch sehr und erreichen sogar Dimensionen bis zu 18 μ; diese Riesensporen sind oft ellipsoidisch, ei- oder nierenförnig und dürften wohl von ungünstigen Entwicklungsverhältnissen bedingt sein.

Physarum sinuosum (Bull.) Weinm. ex Fr.

Masatierra: Quebrada de la Damajuana (30. Dez. 1916); Wald bei Plazoleta del Yunque (28. Dez. 1916), — Gut entwickeltes und typisches Material.

Fuligo septica (L.) Gmel.

Masatierra: Cordón del Centinela (11. Apr. 1917). — Die Exemplare gehören der *var. flava* (Pers.) an, die übrigens schon von BERTERO und JOHOW auf Masatierra gesammelt wurde.

Diachæa leucopoda (Bull.) Rost.

Masatierra: Wald in der Nähe von Plazoleta del Yunque (28. Dez. 1916); Quebrada de la Damajuana (30. Dez. 1916). — Typisch, auf trockenen Zweigen und Blättern (von *Aristotelia,* Farnen u. a.) reichlich wachsend.

Didymium melanospermum (Pers.) Macbr. *var. minus* List.

Masatierra: Quebrada de la Damajuana (30. Dez. 1916); Cordón del Centinela (11. Apr. 1917).

Didymium nigripes (Link) Fr.

Masatierra: Quebrada de la Damajuana (30. Dez. 1916); Pangal (1. Jan. 1917); Pico Central (18. Jan. 1917). Alle sind zur Hauptart mit dunkel orangefarbigen Stielen zu rechnen, die Exemplare von Pangal sind jedoch auffallend grob gebaut.

Stemonites splendens Rost.

Masatierra: La Damajuana, im Wald ungef. 500 m ü. M. (29. Jan. 1917). — Gehört zur Hauptart. Das oberflächliche Netzwerk des Kapillitiums hat kleine Maschen (15—40 μ Diam.); die Sporen sind glatt und zeigen sogar bei 1200 mal Vergrösserung keine deutlichen Warzen.

Comatricha nigra (Pers.) Schroet.

Masatierra: La Damajuana, ca. 500 m ü. M. (29. Jan. 1917); Wald bei Yunque (Aug. 1917). — Alle Exemplare haben zylindrische (ca. 2 mm lange) Sporangien, die im Bau des Kapillitiums mit der *var. laxa* (Rost.) R. E. Fr. [Syn. *Comatricha laxa* Rost.] übereinstimmen.

Cribraria aurantiaca Schrad.

Masatierra: Quebrada de la Damajuana (9. Apr. 1917).

Licea flexuosa Pers.?

Die von JOHOW auf Masatierra gesammelte und unter dem Namen *Licea Schoenleinii* beschriebene Art ist der kurzen Beschreibung nach zu urteilen wahrscheinlichst mit *flexuosa* zu identifizieren (vgl. LISTER, Monogr. ed. II. S. 189).

Lycogala Epidendrum (L.) Fr.

Masatierra: Juanango (9. Apr. 1917).

Trichia verrucosa Berk.

Masatierra: ohne näher angegebenen Fundort. **Masafuera:** Las Chozas (26. Febr. 1917).

Die Elateren beider Kollektionen sind auffallend dick, ungef. 7,5 μ in Diameter. Die Exemplare von Masafuera sind im übrigen ganz typisch, die von Masatierra bieten ein besonderes Interesse dar, weil sie teilsweise Übergangsformen zu *Trichia affinis* De Bary aufweisen. Die Sporangien sind nämlich teils fast ganz stiellos, teils kurz, teils typisch lang gestielt. Sie sind jedoch im allgemeinen, wie bei der echten *verrucosa*, gruppenweise vereinigt.

Trichia decipiens (Pers.) Macbr.

Masatierra: Quebrada de la Damajuana, ungef. 500 m ü. M. (29. Jan. 1917). — Nur ein paar kleine Sporangiumbruchstücke, dank dem charakteristischen Bau des Kapillitiums und der Sporen allerdings gut erkennbar.

Trichia Botrytis Pers.

Masatierra: Valle Colonial, Pico Central 350 m ü. M. (18. Jan. 1917).

Die Exemplare gehören der *var. lateritia* (Lév.) List. an, die zuerst aus Chile — als Art — beschrieben worden ist. Nach LISTER (Monogr. ed. II.

S. 218) haben diese Exemplare »nearly black sporangia». Das Material von Juan Fernandez hat auch schwarze Sporangien, die einzeln sitzen und von langen, helleren Stielen getragen werden. Das Kapillitium ist typisch.

Hemitrichia clavata (Pers.) Rost.

Masatierra: im Wald auf dem Gebirgsrücken zwischen den Piedra agujeriada und Laura-Tälern, ca. 500 m ü. M. (4. Apr. 1917). — Wohl entwickelte, typische Exemplare mit gestielten Sporangien; das Kapillitium mit wenigen Verzweigungen. Von JOHOW ist diese Art sowohl für Masatierra als für Masafuera angegeben worden.

Arcyria denudata (L.) Macbr.

Masatierra: Plazoleta del Yunque (28. Dez. 1916); Valle Colonial, Pico Central, ca. 350 m ü. M. (18. Jan. 1917); Quebrada del Juanango (3 Apr. 1917). **Masafuera:** Quebrada de las Casas (11. Febr. 1917).

Arcyria insignis Kalchbr. & Cooke.

Masatierra: Quebrada de la Damajuana (30. Dez. 1917).

THE NATURAL HISTORY OF JUAN FERNANDEZ AND EASTER ISLAND

EDITED BY DR. CARL SKOTTSBERG

VOL. II

BOTANY

PART II

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UPPSALA 1922

ALMQVIST & WIKSELLS BOKTRYCKERI-A.-B.

4. Die Gasteromyceten der Juan Fernandez- und Osterinseln.

Von

THORE C. E. FRIES.

Dr. C. SKOTTSBERG hatte die Güte, mir das von ihm während seiner Reise 1916—1917 gesammelte Gasteromycetenmaterial zur Bestimmung zu übergeben. Die Sammlung ist unbedeutend und enthält nur drei Arten. Doch sind sämtliche neu für die in Frage kommenden Inseln.

Vorher hat JOHOW (Flora de las Islas de Juan Fernandez (1896) p. 188) zwei Gasteromycetenarten von Juan Fernandez angegeben. Mit Rücksicht darauf, dass die Kenntnis der Gasteromycetenflora sowohl auf Juan Fernandez als auf der Osterinsel noch immer als sehr mangelhaft angesehen werden muss, bietet die fragliche Pilzgruppe wenig pflanzengeographisches Interesse. Sämtliche nach Art bestimmbare Kollektionen gehören doch bekannten Arten aus Australien und Amerika an. — Es dürfte deshalb mit grosser Wahrscheinlichkeit angenommen werden können, dass die Gasteromycetenflora der Juan Fernandez- und Osterinseln eine grössere Anzahl endemischer Arten nicht aufzuweisen haben.

Ileodictyon gracile Berk.

Von JOHOW angegeben aus Masatierra. Mit Rücksicht auf die ziemlich schwebende Artbegrenzung innerhalb der Genus *Ileodictyon* dürfte *I. cibarium* Tul. als mehr Kollektiv vorzuziehen sein. — Ausbreitung: Australien, Neuseeland, Südamerika und Südafrika.

Calvatia sp.

JOHOW nimmt in seine Liste ein *Lycoperdon* sp. (*an nova?*) aus Masatierra und S:ta Clara auf. Aus der Beschreibung geht mit voller Deutlichkeit hervor, dass eine Art von der Gattung *Calvatia* (Fr.) Morg. gemeint wird. Ohne Zugänglichkeit des JOHOW'schen Materiales ist indessen eine Artbestimmung unmöglich.

Lycoperdon (?) sp.

Ein einziges unreifes Exemplar. Artbestimmung unmöglich; ist indessen nicht identisch mit JOHOW's *Lycoperdon* sp. (*an nova?*). — Masafuera: Los Inocentes, ca. 1100 m ü. M. $^{9}/_{5}$ 1917. C. SKOTTSBERG.

Bovistella pusilla Lloyd (in Myc. Not. N:o 34. 1910).

Drei gute Exemplare. — Osterinsel: Cerro Katiki $^{16}/_{6}$ 1917. C. SKOTTSBERG. Ausbreitung: Australien.

Geaster Ohiensis (Cooke) Lloyd. (Syn. *Cycloderma Ohiensis* Cooke und *Geaster velutinus* Morg.).

Zwei ungeöffnete Exemplare. — Masatiera: Südabhang des Yunque $^{24}/_{4}$ 1917. C. SKOTTSBERG. — Ausbreitung: Nordamerika, Samoa-Inseln.

5. The Phanerogams of Easter Island.

By

CARL SKOTTSBERG.

With Plates 6—9 and 2 text-figures.

In no. 2 of this volume I have published, together with Dr. CHRISTENSEN, a list of the ferns reported from Easter Island. While reading the proofs I received from Professor B. L. ROBINSON of Harvard University, Cambridge, Mass., a complete set of the collection made by AGASSIZ and his comrades during the Albatross Expedition (1904). It was then impossible to take into due consideration the ferns contained in this collection. It does not extend our knowledge of the fern flora; still I find it better to enumerate the species found by AGASSIZ with the remarks written on his labels as an appendix to this paper, especially as his collection was made before that of FUENTES.

The latest and most complete enumeration of the flowering plants is to be found in FUENTES' »Reseña botánica sobre la Isla de Pascua» (Inst. Centr. Meteor. y Geofís. de Chile no. 4, 1913 and Bol. Mus. Nac. de Chile V: 2, 1913). The earliest collection seems to have been made by G. FORSTER during COOK's second voyage: most of the plants found by FORSTER were enumerated in his »Florulae insularum australium prodromus», Göttingen 1786. Some species mentioned by FORSTER in his narrative (A voyage round the world, London 1771 vol. I) do not figure in the Prodromus, as for example such an important plant as *Sophora* (the Mimosa of FORSTER). A. v. CHAMISSO, during the voyage of KOTZEBUE (see »Reise um die Welt, 4. Aufl., Berlin 1856) also collected plants on Easter Island, and has been quoted as collector in a few cases. In 1836, S. ENDLICHER included all statements related to Easter Island plants in his »Bemerkungen über die Flora der Südseeinseln (Ann. des Wiener Museums der Naturgeschichte I). HEMSLEY's list in »Report on the present state of knowledge of various Insular Floras» (Report Challenger, Bot. I p. 15, 1885) is based on ENDLICHER, but *Sophora tetraptera* and *Sesuvium portulacastrum* are added.

FUENTES confined himself to an enumeration of what he had collected on the island in 1911; his list contains 40 indigenous or naturalized species. Many of these had been found by the Albatross expedition seven years earlier,

together with several species not found by FUENTES. On the request of Professor ROBINSON I have determined the »Albatross» collection. All the determinations, together with the notes on the labels[1], as well as all previous records known to me, are included in my list.

Finally, it should not be forgotten that the cultivated plants were treated by FUENTES (l. c.) and lately by W. KNOCHE in »Ueber die Kulturpflanzen der Osterinsel» (Zeitschr. des Deutsch. wiss. Ver. zur Kultur- und Landeskunde Argentiniens, Buenos Aires 1919). In some cases we cannot tell whether a plant used by the natives as a food plant or for other practical purpose was a member of the flora when the first settlers arrived or if it was introduced by the natives on that occasion or later (but in any case before the discovery of the island in 1722). When I made my remarks on the cultivated plants (Notes on a visit to Easter Island, Vol. I of this work), the news of KNOCHE's paper had not yet reached this country. According to him, the sweet potato existed in Easter Island already before the visit of ROGGEVEEN, the discoverer; for BEHRENS, who accompanied ROGGEVEEN, enumerates »Bataten, die wie Brot schmeckten». ROGGEVEEN himself did not mention this plant, unless it was included under »aardgewasch». However, as BEHRENS expressly states that sweet potatoes were plentiful, they must have existed long before the Europeans landed on the island.

In the determination of my plants I was assisted by Prof. Dr. R. PILGER (Gramineae), Superintendent Dr. G. KÜKENTHAL (Cyperaceae, see FEDDE's Repertorium XVI, 1920), Mr. J. HUTCHINSSON (Sisyrinchium, Polycarpon), Mr. O. E. SCHULZ (a Nasturtium) and Prof. Dr. G. BITTER (a Solanum). I hereby cordially thank them for their kind assistance. My thanks are also due to Dr. O. STAPF and other members of the staff at the Kew Herbarium for great help in various matters during my visit to that establishment.

An* before a latin name signifies that the species has not been recorded before.

The specimens collected by the Albatross Expedition are quoted thus: Albatross no. —! All other numbers refer to the collection made by the writer and Mrs. SKOTTSBERG. The zoologist, Mr. BÄCKSTRÖM, brought me a few plants from Motu Nui, the small rock near the southwestern promontory of Easter Island. A map, showing the localities mentioned below, was published in Vol. I, No. 1.

[1] »Rana Koa» and »Rana Roka» on the labels have been corrected to Rano Kao and R. Raraku.

Catalogue of Easter Island Phanerogams.

1. Species undoubtedly or probably indigenous.

Gramineae.

Paspalum L.

*1. **P. Forsterianum** Flügge. — Plate 6, fig. 1.

Albatross no. 7! Hanga Ho Orno, near the sea (no. 641); rocky beach north of Hanga Piko (no. 665); Islet Motu Nui.

Dr. PILGER remarks: »Mir lag ein ziemlich unvollkommenes Exemplar aus dem Hb. SPRENGEL vor (Nova Caledonia: FORSTER): die unteren Halmteile fehlen an dem Exemplar. Doch erscheint die Zugehörigkeit der Exemplare von der Oster-Insel zur selben Art sicher.»

Area of distribution: New Caledonia, Easter Island.

2. **P. scrobiculatum** L. var. *orbiculare* (Forst.) Domin.

FORSTER; FUENTES. — Between Hanga Ho Orno and Puhi; not uncommon round Mataveri; Rano Kao (no. 694).

Area of distribution: Austral., N. Caled., N. Guinea, Polyn.

Axonopus Beauv.

3. **A. paschalis** Pilger nov. spec. — Syn. *P. scoparium* Flügge var. nov. *oligostachyum* HACK. ex FUENTES, l. c., *P. paschale* Stapf, nomen, ibid. — Plate 6, fig. 2.

Culmus erectus, vaginatus, apice breviter cum panicula exsertus, vel usque ad basin paniculae vaginis vestitus, vaginis ad basin culmi distiche sese tegentibus compressis, vagina suprema sub panicula elongata, ad 20 cm longa; culmus cum panicula 30—50 cm altus, e vagina suprema nonnumquam florifero-ramosus, nodis dense albido-pilosus, innovationes extravaginales erectae; foliorum lamina linearis, secus medianum plicata vel demum subplana, apice ipso brevissime contracta et acuta, apicem versus scaberula, ceterum ± hirsuto-pubescens vel fere glabrescens, basi longe hirsuta, ligula margo brevissimus ciliolulatus; panicula spicis paucis erectis composita, rhachis communis brevis; spicae ad 9—10 cm longae strictae, rhachis angulata, triquetra, marginibus scaberula; spiculae singulae, biseriatae, ovales, apice parum attenuatae, compressae, 3 mm longae, gluma infera et gluma florifera anticae; gluma vacua infera dorso applanata, marginibus inflexa, membranacea, ovata, subobtusa, nervus medianus nullus, laterales ± conspicui utroque latere 3—4; gluma supera ovata, magis angustata, dorso haud applanata, medianus tenuis, nervi laterales utroque latere 2—3; glumae dorso ad nervos pubescentes; gluma florifera indurata straminea, glumis

vacuis paulo brevior, extus visa ovalis, expansa rotundato-elliptica, apice minute puberula.

Apparently widely dispersed over the island. — FUENTES; »common throughout the island», summit of Rano Kao (Albatross no. 49!); Mt. Katiki, in the crater, 412 m (no. 1191); Hanga Ho Orno (no. 644); between Mataveri and Rano Raraku; slopes of Rano Kao, scarce; crater lake of Rano Kao, on the moss peat, 110 m (no. 1189).

Dr. PILGER remarks: »Die Gattung *Axonopus* ist hier im Sinne der amerikanischen Agrostologen gefasst, mit *A. compressus* (Sw.) Beauv. (Paspalum platycaulon Poir.) als typische Art (vergl. über die Gattung A. CHASE, Notes on Genera of Panicum IV, Proc. Biol. Soc. Washington XXIV (1911) 129 ff.). Die Art ist wohl dieselbe, die in der Arbeit von FUENTES als *Paspalum scoparium* Flügge var. *oligostachyum* Hack. oder *P. paschale* Stapf nov. spec. ohne Beschreibung aufgeführt wird. Eine Beschreibung ist mir nicht bekannt geworden. *Axonopus paschalis* ist mit *Paspalum scoparium*, welche Art auch zu *Axonopus* zu stellen ist, verwandt, aber gut unterschieden, neben anderen Merkmalen schon durch den Blütenstand.»

Area of distribution: Endemic.

Stipa L.

*4. **S. horridula** Pilger nov. spec. — Plate 6, fig. 3; text fig. 1 a.

Perennis caespitosa, innovationibus intravaginalibus dense aggregatis; foliorum innovationum lamina stricta, angustissima, filiformis, subtereti-convoluta, brevissime hirto-scabra, ad 30 cm longa, ligula brevis bilabiata, vagina brevis striata, margine superne breviter ciliolata, ad 4—6 cm longa; culmus caespitem innovationum valde superans, erectus, cum panicula 80—90 cm altus, 3—4-nodus, vaginatus, vaginis internodia parum longitudine superantibus, nodis glabris, lamina foliorum culmi ad 2 cm longa; internodium supremum elongatum, panicula basi vagina circumdata; panicula 30—40 cm longa angusta laxiflora, rami a basi pluries divisi, ramuli igitur ad nodos subfasciculati breves erecti, infimi ad 7 cm longi, internodia inferiora paniculae 3—5 cm longa; spiculae angustae; glumae vacuae tenues angustae nitidulae, longe tenuiter angustatae acutissimae, subaequales, 13—14 mm longae, scaberulae; gluma florifera angusta, 4 mm longa, callo elongato acutissimo, albido- vel flavidulo-hirsuto, circ. 2 mm longo instructa, satis parce albido-hirsuta, coronula nulla, arista tenuis 5—6,5 mm longa, parte infra geniculum parum torta circ. 1 cm tantum longa, parce hirtula, parte supra geniculum scaberula.

Mt Katiki, stray patches on the western slope (no. 660).

Dr. PILGER remarks: »Die neue Art gehört zur Gruppe der Stipen mit unbefiederter Granne und fehlendem Krönchen, die Granne ist gegen die Deckspelze nur einfach abgegliedert. Verwandte Arten kommen sowohl in Südamerika wie in Australien vor (etwa *S. scabra* Lindl., etc.). Ein näherer geographischer Anschluss der schönen neuen Spezies ist somit nicht sicher anzugeben.

Area of distribution: Endemic.

Sporobolus R. Br.

5. **S. indicus** (L.) R. Br.

One of the most important grasses, covering considerable areas. — FUENTES. »Common throughout the island» (Albatross nos. 9! 23!). Observed in great quantities along the north coast and on Mt. Katiki (no. 639) up to the top, 412 m (no. 1190); also common round Mataveri (no. 702) and along the west coast as well as on Rano Kao and from here to Rano Raraku, which is covered by this species (also Albatross no. 48!).

Area of distribution: S. Asia to Australia and Polynesia.

Agrostis L.

6. **A. filiformis** (Forst.) Spreng. Fl. Hal. Mant. Prima (1807) p. 32. — Text fig. 1 b, c.

Dr. PILGER remarks on this species: »FORSTER beschrieb die Art zuerst in Florul. Ins. Austr. Prodr. (1786) 9 als *Avena filiformis* (panicula erecta tenuissima, calycibus unifloris, aristis calyce duplo longioribus. F. Nova Zeelandia et insula Paschatis). SPRENGEL, der die Art zu *Agrostis* brachte, giebt als Standort nur Insula Paschatis an. Die Art liegt in der Sammlung in zwei Formen vor, die beide nicht genau dem Original von FORSTER entsprechen, das mir aus dem Herb. SPRENGEL vorlag. Dieses hat eine ziemlich dichte Rispe, die Hüllspelzen sind 3 1/2 bis fast 4 mm lang, die Deckspelze ist fast 2 mm lang, ihre Behaarung ist spärlich, die Granne ist verhältnismässig kräftig, etwas gekniet, bis 6 mm lang; der Achsenfortsatz ist sehr kurz. Das Ex. no. 687, das der Originalform näher steht (Textfig. 1 b) hat 4 1/1—5 mm lange Hüllspelzen; die Deckspelze ist 2 1/2 mm lang, ziemlich reichlich weisslich behaart, 4-spitzig, die Granne ist 4 1/2 mm lang; die lanzettlich-eiförmige Vorspelze erreicht fast die Länge der Deckspelze, der Achsenfortsatz ist 1 mm lang, lang behaart; Staubblätter 3 mit 3/4 mm langen Antheren; die Rispe ist sehr locker, mit stark abspreizenden Ästen. Die zweite Form entspricht mit ihren kleineren Ährchen der Form, die WILLDENOW als *A. retrofracta* beschrieben hat (Textfig. 1 c); die Hüllspelzen sind 2 1/2 bis 3 mm lang, die Deckspelze 1 1/2 mm, ihre Granne 3 1/2 mm.

Agrostis filiformis ist unter vielerlei Namen beschrieben worden, die DOMIN in Bibl. Bot. 85 (1915) 351—52 zusammengestellt (unter *Deyeuxia filiformis*). Bei den neueren Autoren geht die Art gewöhnlich unter *Deyeuxia* (*D. Forsteri* Kunth, BENTHAM, Fl. Austral. VII. 579; CHEESEMAN, Manual New Zeal. Fl. 868; *D. filiformis* Petrie in CHILTON, Subant. Islands New Zeal. II (1909) 474; DOMIN l. c.). Trotz des deutlichen Achsenfortsatzes muss aber die Art zu *Agrostis* gestellt werden, da sie sich von *Deyeuxia* (welche Gattung mit *Calamagrostis* zu vereinigen ist) durch die kurze, breite, oben stark abgestutzte und gezähnelte Deckspelze unterscheidet; die Callushaare am Grunde der Deckspelze sind sehr kurz. Sie ist in Australien, auf Neu-Seeland und Tasmanien verbreitet und kommt auch auf Hawaii vor. *A. filiformis* variiert sehr stark inbe-

Fig. 1. *a* Spikelet of *Stipa horridula* Pilger, × 2½; *b* of *Agrostis filiformis* (Forst.) Spreng., × 10 and *c* of *A. retrofracta* Willd., × 10. *d—h Danthonia paschalis* Pilger, × 5; *d* spikelet, *e* flowering glume, back view; *f* flower, front view; *g*, *h* paleae, outer and inner surface. — Drawn by C. SKOTTSBERG.

zug auf die Grösse der Ährchen, Behaarung der Deckspelze, Länge der Granne und des Achsenfortsatzes u. s. w.; CHEESEMAN besonders führt von Neu-Seeland eine Anzahl von Varietäten an, doch ist bisher keine befriedigende weitere Gliederung der Art erreicht worden.»

The more typical form with the larger spikelets (Fig. 1 b) was found once only, in the swamp of the crater lake of Rano Aroi, c. 400 m, rather abundant

(no. 687). *A. retrofacta* (fig. 1 c) is in the Albatross collection: no. 26! 27! »summit of Rano Kao, probably abundant»: no. 53! I found it in the small crater of Mt. Katiki, 412 m (no. 661) and also in Rano Kao.

Area of distribution: Austral., Tasman., N. Zeal., Hawaii, Easter I. *A. retrofracta* was described from Australia.

In ENDLICHER l. c. p. 158 *Deyeuxia Chamissonis* (Trin.) Kunth is quoted from Easter Island. To judge from the description in Enum. plant. I p. 242 this must be another form of *A. filiformis*, with a shorter awn. Further, ENDLICHER lists *Arundo conspicua* Forst. = *Agrostis conspicua* (Forst.) Roem. et Schult. from New Zealand and Easter Island, leg. FORSTER. The latter locality must be a mistake, FORSTER does not mention Easter Island, where the species in question does not occur. It is endemic in New Zealand and a very conspicuous grass.

Dichelachne Endl.

7. **D. sciurea** (R. Br.) Hook. fil. — Syn. *D. crinita* and *D. sciurea* var. nova *monandra* Hack., FUENTES l. c.

Not uncommon. — »Common throughout island, scattered tussocks, 6—7,5 dm» (Albatross nos. 4! 28!); top of Rano Kao (Albatross no. 46!, f. ad D. crinitam); Mt. Katiki, on the slopes (no. 659, f. ad D. crinitam) and edge of crater, 412 m (no. 1187); Hanga Ho Orno, scattered; Rano Aroi, stony ground in the crater, c. 400 m (no. 688).

Dr. PILGER remarks to this species: »Die langbegrannte Form (no. 659) steht der *D. crinita* (L.) Hook. fil. sehr nahe; die Hüllspelzen sind fein und lang gespitzt und fast gleich, die Granne ist tief auf dem Rücken der Deckspelze eingefügt, während bei der typischen *D. sciurea* die Hüllspelzen kürzer gespitzt sind und das freie Ende der Deckspelze nur kurz ist (nos. 688, 1187). Auch CHEESEMAN (Manual New Zeal. Fl. (1906) 874) erwähnt bei *D. crinita* eine Uebergangsform zu *D. sciurea*, die var. *intermedia* Hack. Die Blüte hat nur ein Staubblatt, wie es auch schon R. BROWN für seine *Agrostis sciurea* und *A. rara* angiebt (Prodr. 171). DOMIN setzt für *D. sciurea* den Namen *D. micrantha* (Cav.) Domin wegen *Stipa micrantha* Cav. Icon. V (1799) 42 t. 467. Wie schon BENTHAM in Fl. Austral. VII. 566 hervorhebt, ist die dem schlechten Habitusbild beigegebene Figur B. gänzlich mit *Dichelachne* unvereinbar; auch die Beschreibung stimmt nicht für diese Gattung.»

Area of distribution: Austral., N. Zeal., Easter I.

Danthonia DC.

*8. **D. paschalis** Pilger nov. spec. — Text fig. 1 d—h.

Dense caespitosa, innovationibus permultis extravaginalibus, basi squamis rigidis instructis, ± erectis et aggregatis, rarius parte inferiore decumbentibus, brevibus, internodis perbrevibus, vaginis magna pro parte sese tegentibus, folio-

rum lamina angustissima, filiformi-involuta, sulcato-striata, parum vel vix hirsutulo-inspersa, ad 7—8 cm longa, vagina dense sulcato-striata, ore albido-pilosa; culmi graciles tenues caespitem valde superantes ad 35 cm alti, erecti vel parum geniculati, laeves, nodi glabri; inflorescentia e vagina suprema longe exserta, vagina suprema 3—5 cm longa, lamina ad 3 cm longa; internodium sequens ad 10 cm longum, vagina pluries brevior; inflorescentia depauperata 3—7 cm longa simpliciter racemosa, spiculis paucis breviter pedicellatis composita, vel ad basin inflorescentiae ramulus bispiculatus; spiculae ad 6-florae (flore supremo parum evoluto), glumis vacuis circumdatae; glumae vacuae lanceolatae, apice acutiusculae vel obtusiusculae, 9—10 mm longae, inferior superiorem basi amplectens, parum vel vix longior, glumae medio tantum nervosae, margo latus enervius, nervi 5, in inferiore et 7, virides, prominentes, approximati; gluma florifera expansa elliptica, cum callo (internodio rhachillae) albido-barbato, 1—1,5 mm longo decidua, sine lobis lateralibus 4 mm longa, lobi laterales lanceolati, sensim sat aequaliter angustati et aristiformi producti, arista inter lobos 3 mm supra basin glumae orta, pars inferior brunnea, 2—3 mm longa, cum lobis lateralibus ± connata et vix vel non torta, pars superior ad 6—7 mm longa, obscure viridis; nervi laterales utroque latere 3, virides, prominentes, in lobos laterales excurrentes, gluma basi longe albido-pilosa, praeterea ad marginem utroque latere fasciculo pilorum albidorum insertionem aristae parum superantium instructa; palea brevis, ovalis, apice truncata et leviter bilobata, 2,5—3 mm longa, nervi marginales; caryopsis ambitu ovalis, crassa, compressa, latere hili applanata ad parum concava, 2 mm longa.

Only seen once, very scarce on the slope of Mt. Katiki near the summit (no. 658). There is more material in the Albatross collection; the label runs: »summit of Rano Kao»; »common throughout the island» (no. 51!). I do not think the latter statement is quite correct: even if the season was rather unfavorable during our visit, this grass is too conspicuous to be overlooked, and it was not observed by FUENTES.

Dr. PILGER remarks on the affinity: »Die neue Art ist verwandt mit der chilenischen *D. chilensis* Desv., aber doch durch charakteristische Merkmale unterschieden: bei *D. chilensis* ist die Vorspelze verhältnismässig länger und nach der Spitze zu verschmälert, die Seitenlappen der Deckspelze sind nach aussen zu breiter, fast geflügelt, die Nerven treten nur schwach hervor und die Ränder der Deckspelze sind gleichmässig behaart, während bei der neuen Art 2 Haarbüschel hervortreten, die mit ihren Spitzen etwas über die Einsatzstelle der Granne hervorragen.»

Area of distribution: Endemic.

Eragrostis Host.

9. **E. elongata** Jacq. — Syn. *E. diandra* Steud., FUENTES l. c.

Albatross nos. 8! 24! Slope of Mt. Katiki; round Hanga Ho Orno, on lava fields (no. 645); between the north coast and Puhi, frequent on small red tufa hillocks.

Area of distribution: East India, Polynesia.

(*Lepturus repens* R. Br. (Australia, Polynesia) is listed by ENDLICHER l. c. (»teste Trin.»). TRINIUS must have based his statement on material collected by CHAMISSO, whose specimens probably belong to one of the Petersburg herbaria. Nobody has seen the plant later and the statement cannot be verified.)

Cyperaceae.

Cyperus L.

10. **C. vegetus** Willd.

Moist places, edges of crater lakes, etc. — FUENTES. »Enclosure for banana tree (Albatross no. 11!) Mt. Vaintu Rova, humid cave; Rano Aroi, vigorous plants in the crater; crater of Rano Kao (no. 1170); »scattered patches about edge of marsh, also in wet places about the island», (Albatross no. 54!); west slope of Rano Kao; Rano Raraku (Albatross nos. 31! 32!).

Area of distribution: Temp. S. Amer., Juan Fernandez, Easter I.

*11. **C. polystachyus** Rottb.

Rano Aroi, in the crater, c. 400 m, one specimen seen (no. 686).

Area of distribution: Subcosmop. trop.-subtrop.

12. **C. cyperoides** (L.) Kükenth. — Syn. *C.* (Mariscus) *Sieberianus* Kth., FUENTES l. c.

N. slope of Rano Kao, scattered (no. 675); between Mataveri and the lepra colony, common in wet patches.

Area of distribution: Widely dispersed trop.-subtrop.

Kyllinga Rottb.

13. **K. brevifolia** Rottb.

Scattered over the island, more frequent on higher ground. — FUENTES. Mt. Katiki, quite common, copious in the crater, 412 m; Hanga Ho Orno, in crevices between lava boulders (no. 643); »common on plains» (Albatross no. 10!); Rano Aroi, frequent along the pond, c. 400 m; Rano Kao, common (also Albatross no. 52! »abundant throughout the island»); between Mataveri and Rano Raraku; Rano Raraku (Albatross no. 34!).

Area of distribution: Widely dispersed within the tropics.

Scirpus L.

14. **S. riparius** Presl var. *paschalis* Kükenth. l. c. — Plate 7.

»Culmus 3—4 metralis subteres ad 2 cm crassus, basi vaginis haud reticulatim fissis obtectus. Anthela decomposita ampla spiculis innumerosis ornata».

»S. esp. gigantesca»; »en los cráteres» (FUENTES!); Rano Aroi, smaller;

Rano Kao, forming an extensive association along the edge of the lake (no. 676; »common rush of the marsh growing 2,5 m high», Albatross no. 55!); Rano Raraku, few, small stands (also Albatross no. 33!).

The variety differs from the ordinary form mainly in its greater size and more compound panicle. The largest plants grow in Rano Kao. The plant from Rano Aroi was called *S. riparius* by FUENTES, who regarded the large form from Rano Kao, which he collected sterile, as another species. The smaller rush was seen by us in a small stream with almost stagnant water, flowing from Rano Aroi, but was not collected, as we intended to return to the same place; from this we were prevented by the sudden departure of the vessel. I do not think that more than one species grows in the island: if FUENTES *S. riparius* is of the same size and habit as the ordinary plant, var. paschalis may be a local form of the sheltered crater lakes, best developed in the deepest crater, that of Rano Kao. KÜKENTHAL does not indicate any characters in the spikelets or flowers to distinguish it from the type.

Area of distribution: Calif. and Texas to Fuegia and Falkl., Hawaii, Easter I.

Juncaceae.

Juncus L.

*15. **J. plebeius** R. Br.

Western edge of Rano Kao (no. 680), c. 300 m. — New for Easter Island.

The specimens are typical. According to BUCHENAU in Pflanzenreich, Junc. p. 115, the flowers probably always are cleistogamous. This is also the case with the majority of the flowers in my material; they have three stamens with anthers coherent with the very small stigmas. Only in very few cases normal open flowers were seen, with six fully developed stamens and long stigmas.

Area of distribution: Austral., Tasman., N. Zeal., Easter I.

Polygonaceae.

Polygonum L.

16. **P. acuminatum** H. B. K. — Plate 8, fig. 1.

Common in the three large craters. — »Comun en los 3 cráteres» (FUENTES!); Rano Aroi, few and small patches; Rano Kao, abundant along the lake (no. 679; »very abundant in marsh», Albatross no. 56!); Rano Raraku (also Albatross nos. 35! 36!, specimens with narrower leaves).

FUENTES remarks l. c.: »Aunque difiere un poco de la forma típica sud-americana, respeto la opinion de los eminentes botánicos doctores ENGLER i STAPF sobre su identificacion.»

I have compared my specimens with the rich material of this highly polymorphic species in Kew; they differ a little from most other plants in the shorter internodes, often completely covered by the vaginae, whose marginal bristles or setae are very long; the nut seems to be a trifle larger than in most other specimens. Still, plants from Uruguay, collected by E. GIBERT, are very like the insular ones.

On the whole, my specimens agree with α *Humboldtii* Meisn. Fl. Brasil. V: 1 p. 14, tab. 4 fig. 1: only, the leaves are more acuminate and the setae of the ochrea considerably longer. To judge from the description, δ *setigerum* Meisn. l. c. p. 15 (P. setigerum Wedd.) must be very similar. The anthers are described as included in α and exserted in δ, but this is of little consequence, as the species, to judge from my specimens, is heterostylous.

Area of distribution: S. Amer., Columb.-Uruguay (not in Chile). S. Afr. (an aberrant form?). — FUENTES remarks: »Amér. trop. S. de Australia», but Australia must be a misprint for Africa.

Chenopodiaceae.

Chenopodium L.

17. **Ch. ambiguum** R. Br. — *Ch. glaucum*, FORSTER l. c.; var. *paschale* FUENTES l. c. Comp. J. MURR in Allg. bot. Zeitschr. 12 (1906) p. 111.

On the sea shore. Hanga Ho Orno (no. 662); rocky beach near Hanga Piko; Islet Motu Nui (no. 1194).

My specimens were compared with the material in Herb. Kew and Upsala. Some authors regard *Ch. ambiguum* as identical with *C. glaucum* L., while others retain it as a variety. I prefer to keep it as a species, mainly on account of its geographical distribution, but also because I have not seen intermediate forms. FUENTES probably had but a scanty material of *Ch. glaucum* for comparison, for he does not give any character serving to distinguish his insular form from this. I do not understand what he means by »spiculas racemosas muy flojas», for all the specimens I have seen have short and more or less dense inflorescence.

Area of distribution: Austral., Tasman., N. Zeal., Easter I.

Nyctaginiaceae.

Boerhaavia L.

*18. **B. diffusa** L. forma.

Tongariki, near the sea shore (no. 698). — New for the island.

The Easter Island *Boerhaavia* is decumbent, nearly glabrous, with linear-lanceolate or almost ovate leaves, obtuse and minutely apiculate, and whitish below. The inflorescence is mostly a simple axillary umbel of 3—4 flowers, with

a peduncle shorter or longer than the supporting leaf, rarely a poorly developed panicle. It is probably the same form as understood by TRIMEN, Fl. Ceylon III p. 390, DRAKE DEL CASTILLO, Flore Polyn. Franc. p. 158, etc. under *B. diffusa*. But according to CHOISY in DC. Prodr. XIII: 2 p. 452 this has the leaves green on both sides, and my plants agree better with his description of *B. repens* L., but typical repens has only been reported from Africa. HEIMERL in ENGLER & PRANTL, Nat. Pflzfam., regards *B. diffusa* as a collective species, of which *B. repens* is one of many forms. Typical *B. diffusa* is a large plant with a well developed panicle, but there are specimens in herbaria recognized as *diffusa* but with single axillary umbels and also intermediate forms. The leaves are sometimes conspicuously glaucous beneath. The long peduncles in my form remove it from typical *B. repens*.

Area of distribution: Tropical Asia, Austral., Polyn., Afr.

Aizoaceae.

Tetragonia L.

*19. **T. expansa** Murr.

On the coast near Tongariki (no. 700). — First record for Easter Island.

Area of distribution: Japan, Austral., N. Zeal., Polyn., Juan Fern., extratrop. S. Amer.

(*Sesuvium portulacastrum* L. is reported, without any indication of the source, for Easter Island by HEMSLEY l. c. Mr. HUTCHINSON kindly informs me that there is no specimen from this place in the Kew Herbarium, nor has it been quoted by any other author. Its occurrence is, of course, quite possible, but requires further evidence.)

Cruciferae.

Nasturtium R. Br.

*20. **N. sarmentosum** (Sol.) O. E. Schulz.

Mt. Vaintu Rova, moist floor of a small cave; scanty and sterile material in winter state (no. 652). — New for Easter Island.

Area of distribution: Austral., Polynesia, Hawaii.

Leguminosae.

Caesalpinia L.

21. **C. bonduc** (L.) Roxb.

»Encontré dos ejemplares en el centro de la isla»: FUENTES l. c. — Crater of Rano Kao, rare (no. 696).

It is of course not at all certain, that this belongs to the original flora of the island, the more as the tradition, also quoted by FUENTES, tells that it was introduced by the first settlers, long before the discovery of the island by the Dutch. However, its faculty for dispersal with the ocean currents is a well known fact, so that nothing prevents us from believing that it reached Easter Island without human aid. According to GUPPY, Observations of a naturalist in the Pacific II, the seeds of inland stations have lost their buoyancy. FUENTES states that *C. bonduc* is on the verge of extinction in the island; I can neither confirm nor deny this. It is not in cultivation — if it ever was —, and no plants were found along the sea shore.

GUPPY (l. c. p. 185) gives a good summary of the two generally recognized species *C. bonduc* and *bonducella*; he has found intermediate forms and comes to the conclusion that all may belong to one complex taxonomic unity. The Easter Island plant is no »typical» *bonduc*. In the size of its flowers it agrees with this and it has no trace of stipules. But the leaflets are not unequal at the base, as has been stated for *C. bonduc* (comp. GRISEBACH, Flora Brit. W. Ind. Isl. p. 204), but equal as in *bonducella*. According to HELLER, Plants of the Hawaiian Islands (Minn. Bot. Stud. 1897, p 831), *C. bonduc* is glabrous and has broader, blunt leaflets, while *C. bonducella* is pubescent, with comparatively narrow and acute leaflets. The leaflets in my plant answer better to HELLER's *C. bonduc,* but they are clearly pubescent. Bracts are totally absent, even with the young buds. The colour of the seed is greyish as in *bonducella,* not yellowish as in *bonduc*, but GUPPY shows that this character is not a reliable one, and TRIMEN, Fl. Ceylon II p. 98 calls the seeds of *C. bonduc* greyish green, which answers well to the observations of the present writer.

Area of distribution: Trop. Asia, Austral., Polyn.

Sophora L.

22. **S.** (Edwardsia) **toromiro** (R. A. Phil.) Skottsb. — *Edwardsia toromiro* R. A. Philippi, Bot. Zeit. 1873 p. 737; *S. tetraptera* auctt. non J. Mill. nec Ait. — Plate 9; Text fig. 2 a—c.

Crater of Rano Kao, very rare on the steep slope, only one small tree seen by us, growing between large boulders (no. 688; also reported from this locality by FUENTES l. c.).

Edwardsia toromiro of PHILIPPI is hardly more than a name, as no description ever appeared; it was characterized by PHILIPPI as possessing a wood different from that of the Chilean species, which generally goes under the name *S. tetraptera*. FUENTES did not consider the Easter Island plant to be a separate species. A description follows.

Arbor pumila (specimen unicum ab auctore visum 190 cm altum), tortuosa; cortex junior saltem rufo-brunneus, longitudinaliter sulcatus. Folia versus apices ramulorum conferta, plerumque 40—55 mm longa, 8—9- (rarius ad 12-) paria, rhachide tenui dense albosericea; foliola brevissime stipitata, stipite albo-sericeo, ovato-elliptica (sed foliolum terminale plerumque subobo-

vatum), basi cuneato-rotundata, apice truncata et minutissime emarginata, penicillo brevi albo ornata, textura tenui, supra laete viridia, parce pilosa, subtus glaucescentia, pilis albis praecipue secus medianum densius vestita. Legumen longe pedicellatum, ad 10 cm longum, ad 7-locellatum, pro sectione typicum quadrialatum alis angustis circ. 1,5 mm altis transverse striatis, parietibus sat tenuibus, dilute brunneis. Semina sat parva, 4,2—5 mm longa et 3,5—4 mm lata, ovoideo-globosa, basi et interdum apice apiculata, fulva, umbilico obscuro notata.

As far as I can understand, this is a very good species. It differs in several respects from both Chilean and New Zealand specimens of *S. tetraptera*. The pubescence is whitish even in the youngest parts, the leaflets are

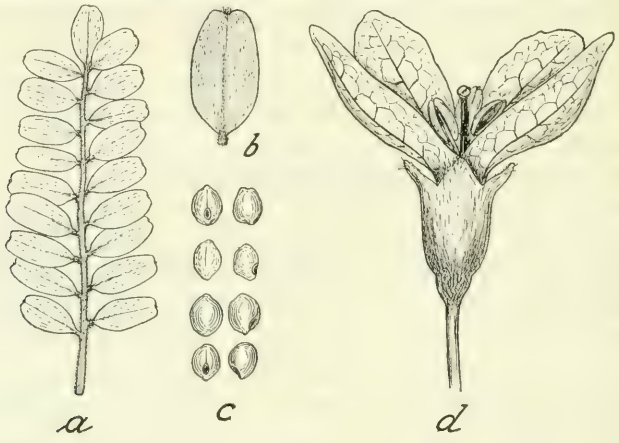


Fig. 2 a—c *Sophora toromiro* (R. A. Phil) Skottsb. *a* leaf, nat. size; *b* leaflet, lower surface, × 2; *c* four seeds, nat. size; *d Lycium sandvicense* A. Gray, flower. × 5. — Drawn by C. SKOTTSBERG.

of a yellowish or otherwise bright green colour above, and very thin, papyraceous; they are also less numerous to the midrib. Finally the seeds are smaller, more globose and yellow. All the forms from Juan Fernandez have quite unwinged pods and larger, oblong-obtuse seeds of a dark castaneous colour, very different from those of the Easter Island species, which is one of the more interesting endemic plants.

S. toromiro will probably soon be extinct. Already at the time of COOK and FORSTER this tree, called *Mimosa* by the latter (Voyage I p. 568) was scarce, though he observed small shrubberies in some places (l. c. 578, 592). Concerning the supposed forests, see my paper in Vol. I (No. 1) of this work. Although, to judge from the famous wood-carvings of the islanders, the stem formerly attained a thickness of a couple of dm at least, only small stunted specimens were left in 1870 (see PHILIPPI, l. c. p. 744). FUENTES calls the tree »muy escasa», and I have not the slightest doubt that the interesting toromiro is on the verge of extinction, which means the disappearance of a species, important from geographical as well as from ethnological point of view.

Area of distribution: Endemic.

Euphorbiaceae.

Euphorbia L.

*23. **E. hirta** L.

Slope of Mt. Katiki (no. 653). »Abundant, rocky places, near La Pérouse Bay (= Hanga Ho Orno), Albatross no. 16!

Area of distribution: Trop. Amer., Polyn., etc.; trop. subcosmop. A common tropical weed, perhaps not truly indigenous in Easter I.

24. **E. serpens** H. B. K. — *E. ovalifolia* Engelm., FUENTES l. c.

Common on rocky and stony ground all over the island, near the sea (no. 1196) or inland (no. 638). »On rocks and barren places, abundant» (Albatross nos. 14! 15!).

Area of distribution: Trop. America, Polyn., also reported from the Indo-Malayan region. A widespread weed, possibly not indigenous in Easter I.

Umbelliferae.

Apium L.

25. **A. prostratum** Labill. — Syn. *A. graveolens* L., FORSTER, De Plantis esculentis insularum oceani australis commentatio botanica. Berlin 1786, p. 67.

Rocky beach and caves near Hanga Piko (no. 697). — My specimens agree very well with *A. australe* Thouars, which, with the material at hand, I cannot distinguish from *A. prostratum:* in fact, I believe they are identical.

Area of distribution: Magellan coasts, Falkl., Tristan d'Ac., Austral., N. Zeal. and outlying islands, Easter I.

Primulaceae.

Samolus L.

26. **S. repens** (Forst.) Pers.

On the sea shore: FORSTER, FUENTES. — N. of Hanga Piko, not uncommon (no. 701); near Tongariki (no. 699).

Area of distribution: Coasts of temp. S. Amer., Austral., Tasman., N. Zeal., Easter I.

Gentianaceae.

Erythraea Borkh.

*27. **E. australis** R. Br.

»Abundant, rocky plains, La Pérouse Bay (i. e. Hanga Ho Orno); Albatross Dec. 16 (no. 19!) — Had disappeared long before our visit, but seedlings, apparently belonging to this species, were observed.

Area of distribution: Australia; Easter I.

Convolvulaceae.

Calystegia R. Br.

*28. **C. sepium** (L.) R. Br. forma.

In the crater of Rano Aroi, c. 400, among large boulders. — A rather narrow-leaved form, probably belonging to this species; only sterile specimens.

Area of distribution: Widely dispersed in temperate regions, also in Australia, Tasmania, New Zealand, etc.

Ipomaea L.

29. **I. pes caprae** (L.) Roth.

Apparently rare. Near Vaihu (»I. affinis pes caprae», FUENTES l. c.); Hanga Ho Orno, stony beach on the water's edge (no. 634).

Area of distribution: Widely dispersed on tropical shores.

Solanaceae.

Lycium L.

*30. **L. sandvicense** A. Gray. — Plate 8 fig. 2; text fig. 2 d.

Rocky shore below the western slope of Rano Kao (no. 644). — Rather an interesting discovery. The specimens are exactly like Hawaiian ones in the Kew Herb., and also agree very well with the description in Proc. Amer. Acad. VI (1863) p. 44. The leaves show numerous whitish pustules, irregular vesicles in the mesophyll, filled with salt.

Area of distribution: Hawaii, Easter I.

2. Plants now occurring in a wild or semi-wild state but reported to have been intentionally introduced by the first native immigrants.

There is a tradition that all the plants of economic importance were introduced and brought into cultivation by the party of the chief Hotu Matua, who was the first to reach Easter Island. Of the few plants mentioned below this may be true, although proofs are wanting, but, on the other hand, it is not altogether impossible that species such as *Cordyline terminalis, Triumfetta semitriloba* or *Thespesia populnea* belonged to the original flora, and that the immigrants were acquainted with their useful qualities and started to propagate them. KNOCHE (l. c. p. 10) regards all the plants used for industrial or medicinal purposes as only naturalized and not wild, but when he includes *Sophora toromiro* among these he is wrong, for we have seen that it is an endemic species, and its nearest relatives, the Chilean and New Zealand species of this genus, do not belong to the widely dispersed oceanic plants, but have a very restricted geographical range; nor have they ever been in cultivation as far as I am aware. It is of course not quite impossible that the islanders, seeing that the precious *toromiro* was rapidly vanishing, tried to propagate it, but there is no reliable evidence that they did so.

Liliaceae.

Cordyline Comm.

C. terminalis Kunth.

In the crater of Rano Kao, on the south side between large stones, c. 125 m, scarce (no. 693); see also FUENTES l. c.

Area of distribution: Indo-Mal. region, N. Guinea, Austral., Polyn., N. Zeal., formerly cultivated by the Maoris.

Moraceae.

Broussonetia Vent.

B. papyrifera Vent.

»Crater of Rano Kao, abundant, but mature trees not numerous»: Albatross no. 58! — We found a number of trees on the stony slope near the pond (no. 670); they agree with the ordinary plant as represented in the Kew Herb.

F. foliis subtrilobis grosseserratis magis scabris: with the former (no. 1147). In the Kew Herb. there is the same or closely allied forms from Oahu (SEEMAN, MACRAE), Fiji (HERALD), Nagasaki (OLDHAM) and Siam. Intermediate forms occur also in Easter Island.

FUENTES calls the mahute »B. aff. papyracea Vent.» adding: »su clasi-

ficacion es dudosa, difiere algo de la forma típica», but this applies only to the aberrant form mentioned above.

Area of distribution: S. E. Asia, Polynesia. DRAKE DEL CASTILLO says l. c. p. 193 that Broussonetia is »sans doute originaire dans la Chine».

Tiliaceae.

Triumfetta L.

T. semitriloba L.

Rano Kao, with Broussonetia, rare (no. 671).

Listed by FUENTES with a query. His plants, which I have seen, as well as mine, are sterile, but I think the determination is correct. This is the jaujau of the islanders, used for making cordage; it was pointed out to us as the true plant for this purpose and we obtained large pieces of string freshly prepared.

Area of distribution: Trop. Asia, Polyn. and Amer.

Sapindaceae.

Sapindus L.

S. saponaria L.

FORSTER and FUENTES.

Malvaceae.

Thespesia Carr.

T. populnea (L.) Carr.

FORSTER, Prodr., reports *Hibiscus bacciferus*, which is considered to be identical with *Thespesia populnea*, from Easter Island. No later collector ever observed it there, so it may have disappeared from the island.

Solanaceae.

Solanum L.

S. (Morella) **insulae-paschalis** Bitter nov. spec. (*S. nigrum* L. coll.).

»Herbaceum, maleolens; partes novellae non jam satis evolutae albide subcanescentes; rami superiores diam. 3—4 mm, obtuse angulati, lineis decurrentibus manifeste prominentibus instructi, pilis simplicibus pluricellularibus (membranis tenuibus in statu sicco ±ve collabentibus) apice in glandulam minutam subglobosam vel ellipsoideam vel rarius in cellulam diaphanam ceteris similem subacutam exeuntibus patentibus sordide albidis 1—1,5 mm longis densis ob-

tecti; internodia 2,5—8 cm longa; folia superiora partim false geminata, tunc inaequalia; petioli 0,6—2 cm longi, ad laminas versus sensim latius alati, eodem indumento denso quo rami vestiti; laminae oblique ovati-ellipticae vel ovatae, infra medium latissimae, basi rotundatae vel ± ve late cuneatim in petiolum alatum abeuntes, ad apicem versus magis sensim angustatae, apice ipso obtusae vel obtusiusculae, cr. 4, 5: 2,5, 5, 5: 3,7, 8: 4,5 cm, margine leviter et obtuse repandi dentato, dentibus in utroque latere 1—3 parum prominentibus obtusis, plerumque infimis tantum unicis in utroque latere distinctioribus; laminae membranaceae, utrinque sordide virides, utrinque pilis simplicibus pluricellularibus inaequilongis (in venis majoribus utrinque longioribus densioribusque, in mesophyllo brevioribus sparsioribusque tamen hic quoque satis crebris) apice acutiusculis partimque subglandulosis partim eglandulosis patentibus praeditae; vena media, venae later. prim. in utroque latere 5—6 curvatim ascendentes et venae later. secund. complures subtus prominentes; inflorescentiae laterales, a foliis remotae, simplices, 4—5-florae; pedunculus cr. 8— (in statu fructifero) 17 mm longus, rhachis brevis, 2— (tandem) 4 mm longa; flores ultimi dense subumbellatim secuti; pedicelli 6—7 mm longi, in statu florifero erecti, in statu fructifero vix longiores, deflexi; calyx campanulatus, 2—2,5 mm longus, apice 3 mm diam., profunde in lobos ovati-ellipticos 1—1,5: 0,6 mm obtusiusculos partitus, extus sicut pedunculus, rhachis et pedicelli pilis simplicibus pluricellularibus apice subglandulosis vel eglandulosis crebris obsitus, intus glandulis minutis breviter stipitatis crebris praeditus; corolla stellata, diam. 11 mm, profunde in lobos 5 late lanceolatos vel ovati-lanceolatos 4—5: (basi) 2 mm acutiusculos extus et in margine pilis simplicibus brevibus paucicellularibus acutis crebris obsitos intus praeter apicem subcucullatum pilis brevibus densiusculis instructum glabros partita; stamina 1—1,2 mm supra corollae basim inserta; filamenta pro floris parvitate longiuscula, 1— (tandem) 1,8 mm longa, intus pilis longiusculis simplicibus pluricellularibus apice acutis vel partim subglandulosis densis obtecta; antherae breviusculae, late ellipsoideae, cr. 1,5: 0,8—1 mm, basi cordatae, apice emarginatae, poris introrsis apicalibus obliquis; ovarium subglobosum, 1 mm diam., glabrum; stylus stamina paulum superans vel illis fere aequilongus, 3 mm longus, rectus, gracilis, paulo supra basim glabram cr. $\frac{2}{3}$—$\frac{3}{4}$ longitudinis pilis simplicibus pluricellularibus acutis vel apice partim anguste subglandulosis patentibus densis obtectus, apice glaber; stigma styli apice manifeste crassius, capitatum, obtusum; calyx fructifer paulum auctus (explanatus diam. 7 mm), ejus lobi 2: (basi) 1,5 mm; bacca globosa, diam. 7—8 mm, ut videtur pallide lutea; granula sclerotica desunt; semina oblique reniformia, lenticulariter applanata, 1,5: 1: 0,3 mm, minute reticulata.»

Hanga Ho Orno, in an old, dry well (no. 663); in the crater of Rano Kao, c. 125 m (no. 695).

»Eine Kleinart aus der Verwandtschaft des *S. nigrum* L., deren wichtigste Merkmale auf der Behaarung (ungleich lange, einfache, mehrzellige Haare, die zum grossen Teil in oft undeutliche schmale, seltener kugelige, winzige Drüsenköpfchen endigen, sowie auf den schliesslich ziemlich langen Staubfäden und den kurzen Staubbeuteln beruhen. Der üble Geruch rührt offenbar von der drüsigen Behaarung her.»

FORSTER tells that he found *Solanum* in the plantations (Voy. I p. 578);

according to LANGLE, a member of LA PÉROUSE's party, it was cultivated as a medicinal herb (see KNOCHE l. c. p. 13). FUENTES lists »*Solanum* sp. (?)» adding »solo conozco por referencias». I have no doubt that all these statements refer to the species found by us and described above by Professor BITTER. This well known expert on the genus *Solanum* has described a number of Morellae of *S. nigrum* type, endemic in the southern seas; in a letter to the writer he points out that »die meisten Morellen sind Menschenbegleiter und durchgängig in der Nachbarschaft des Menschen ansässig».

3. Species unintentionally introduced with the human traffic after the discovery by the Europeans in 1722.

Sorghum halepense (L.) Pers. var. *effusum* (Hack.) Pilger. — Common in enclosures protected from sheep and cattle: Hanga Ho Orno (no. 656); frequently seen between Rano Aroi and Mataveri and between the latter place and Rano Raraku. Introduced from Tahiti acc. to FUENTES l. c. p. 5; brought from Tahiti, not very long ago and possibly on purpose, all acc. to Mr. EDMUNDS, the manager in the island.

**Digitaria horizontalis* Willd. — Hanga Ho Orno, in crevices between stones (no. 649, also Albatross no. 6!); Rano Kao, not uncommon (no. 667); islet Motu Nui (no. 1200).

Digitaria sanguinalis (L.) Scop. — FUENTES l. c. — Widely dispersed over the island (nos. 646, 1192).

[Panicum filiforme in FORST. Prodr. no. 38 is called *Paspalum filiforme* Sw. by ENDLICHER l. c. p. 157. These two names correspond to quite different plants, acc. to Prof. PILGER; the latter is a West Indian species, the former is now called *Digitaria filiformis* Ell. and found in N. and S. America. Possibly the Easter Island plant is only a form of *D. sanguinalis.]*

Cenchrus echinatus L. — FUENTES l. c. — »On hill side, about 15—60 m alt.» (Albatross no. 3!); Hanga Ho Orno (no. 640).

Bromus unioloides H. B. K. — FUENTES l. c. — »Foot of cave just inside Rano Kao» (Albatross no. 50!); Rano Kao, here and there in the crater (no. 674); islet Motu Nui (no. 1107).

Cynodon dactylon (L.) Pers. — FUENTES l. c. — »Abundant everywhere, the common grass» (Albatross no. 5!); Hanga Ho Orno (no. 650); Mataveri; Rano Kao; islet Motu Nui (no. 1188).

Eleusine indica (L.) Gaertn. — FUENTES l. c. — Mataveri (no. 985).

**Hordeum murinum* L. — »Inside of Rano Kao, no other example seen» (Albatross no. 47!)

**Sisyrinchium micranthum* Cav. — »Abundant in rocky plains of low elevations» (Albatross nos. 12! 30!) — A Peruvian species, also introduced into Australia and New Zealand acc. to CHEESEMAN.

**Portulaca oleracea* L. — Growing near beach, not abundant» (Albatross no. 17!); Hanga Ho Orno, not uncommon (no. 636); Mataveri (no. 1198). This may equally well be regarded as indigenous; still, GUPPY thinks it has been introduced into several places in the Pacific, f. inst. to Hawaii (l. c. p. 552).

**Cerastium glomeratum* Thuill. — Very minute specimens, Mt. Vaintu Rova (no. 1199).

**Polycarpon tetraphyllum* L. — »Growing on rocks, abundant» (Albatross no. 13!).

**Coronopus didymus* (L.) Sm. — Hanga Ho Orno, caves in the coast rocks (no. 635).

Crotalaria Saltiana Andr. — »Abundant near village» (Albatross no. 65!); along the road from Hanga Roa to Mataveri (no. 681; also FUENTES l. c.).

Trifolium spec. — Sterile. Hanga Roa.

Phaseolus spec., »affinis vulgaris L.» — Rano Kao, FUENTES l. c.

Oxalis corniculata L. — Dispersed over the entire island in stony places. — »Abundant about rocky walls etc.» (Albatross no. 18!); Hanga Ho Orno (no. 637); Mataveri; Rano Kao.

Malvastrum coromandelianum (L.) Garcke (»coromandelicum»). — FUENTES l. c. s. n. *M. tricuspidatum* A. Gray. — »Crater of Rano Kao, scattered patches (Albatross no. 61!); Mataveri (no. 692).

**Malva* spec. — A weed in the garden of Mataveri.

Sida paniculata L. — A weed in the garden of Mataveri (FUENTES, l. c.).

Verbena litoralis H. B. K. — FUENTES l. c. — »On hill side, 60 m alt. La Pérouse Bay» (= Hanga Ho Orno): Albatross no. 20! Very common along the shore, but also inland in scattered specimens, in the craters and in the cultivated fields (no. 682).

Plantago major L. — FUENTES l. c. — »Common near landing, Cook Bay (= Hanga Roa, Albatross no. 64!):

Plantago lanceolata L. — Mataveri (also FUENTES l. c.).

**Momordica charantia* L. — Mataveri (no. 683). Possibly escaped from old cultivations.

Centaurea melitensis L. — CHAMISSO acc. to ENDLICHER l. c. p. 107, s. n. *C. apula* Lam. Not found by later collectors.

**Ageratum conyzoides* L. — In the crater of Rano Kao (no. 669). A common tropical weed.

Erigeron linifolius Willd. — Hanga Roa, »only example seen (Albatross no. 63!) Common on stony ground, f. inst. Hanga Ho Orno (no. 642). — FUENTES s. n. *E. canadensis* L., which it is not; VIERHAPPER confirms the determination of my specimen.

Bidens pilosa L. — FUENTES l. c. »On hilltop, 60—90 m alt., sparse» (Albatross no. 21!); Hanga Ho Orno (no. 567); Mataveri, in the garden (no. 1193).

Galinsoga parviflora L. — FUENTES l. c. — Mataveri (no. 684).

**Hypochoeris radicata* L. — Rano Aroi.

Sonchus oleraceus L. — FUENTES l. c. — »Summit of Rano Kao, but scattered examples everywhere on island» (Albatross no. 62!); Mt. Teatea; Rano Aroi; Mataveri (no. 1195); Rano Kao.

Appendix.

Ferns collected by the Albatross Expedition.

Asplenium adiantoides (L.) C. Chr. var *squamulosum* C. Chr. — »Crater of Rano Kao, near foot, scarce» (no. 41!).

Asplenium obtusatum Forst. — »Scattering, near shore, on rocks» (no. 1!); »crater of Rano Kao, not abundant» (no. 45!)

Dryopteris parasitica (L.) OK. — »About inside of crater of Rano Kao» (no. 37!); »in cave at summit of Rano Kao» (no. 38!).

Microlepia strigosa (Thunb.) Presl. — »About rocks in all places where moisture is available» (no. 2!); »from crater of Rano Kao, abundant, the common fern of the island» (nos. 39! 42!).

Polypodium phymatodes L. — no. 22! »summit of Rano Kao» (no. 43!); »along large rocks near bottom of crater of Rano Kao» (no. 44!).

Vittaria elongata Sw. — »Summit of Rano Kao, scarce» (no. 40!).

The flora of Easter Island is very poor. As in similar cases, it is sometimes difficult to tell if a certain plant is indigenous or not. If the old authors are trustworthy, cultivation once extended over a large part of the ground, so that several species, members of the original flora, may have become exterminated, and we have seen that *Sophora toromiro* probably goes to share their fate. The small copses said to have existed in the time of COOK may have sheltered some herbs that disappeared later. Unfortunately, there are no high mountains, but the host of weeds is able to sweep over the entire area. Many introduced species play an important part in the plant associations of the island, which I shall describe briefly in another paper. Later, I shall also discuss the affinities and probable origin of the flora; this time I find it proper to confine myself to the following remarks.

Of wild phanerogams, 30 have been reported, out of these 12 for the first time. Four are considered to be endemic *(Axonopus paschalis, Stipa horridula, Danthonia paschalis, Sophora toromiro);* three *(Cyperus vegetus, Scirpus riparius, Polygonum acuminatum)* are common to Easter Island and America but (with the exception of *Scirpus,* reported from Hawaii) not found in other parts of the Pacific; the majority or 23 species are Australian and Polynesian, many of them wide-spread tropical or subtropical plants. If we add the 12 ferns, of which 2 are endemic and 10 Polynesian or pantropical, the total number of indigenous vascular plants amounts to 42, of which 6 are endemic,

3 American and 33 Polynesian, pantropical etc. Of the endemic species, *Dryopteris Espinosai*, *Axonopus paschalis* and *Danthonia paschalis* are considered to have their nearest relatives in South America. Thus, it is of interest to find that there is a small »American element» in the flora of Easter Island, distant some 2,000 miles from the American shores.

Explanation of plates.

Plate 6. 1. *Paspalum Forsterianum* Flügge, flowering shoot (right) and innovation (left). 2. *Axonopus paschalis* Pilger. 3. *Stipa horridula* Pilger. — About 1/3 nat. size.

Plate 7. *Scirpus riparius* Presl var. *paschalis* Kükenth., top of large plant, 1/2 nat. size.

Plate 8. 1. *Polygonum acuminatum* H. B. K. 2. *Lycium sandvicense* A. Gray (base upwards). — 1/2 nat. size.

Plate 9. *Sophora toromiro* (R. A. Phil.) Skottsb., fruiting branch, 2/3 nat. size.

Photo by C. Skottsberg

1. Paspalum Forsterianum Flügge.
2. Axonopus paschalis Pilger.
3. Stipa horridula Pilger.

Photo by C. Skottsberg

Scirpus riparius Presl var. paschalis Kükenth.

Photo by C. Skottsberg

1. Polygonum acuminatum H. B. K.
2. Lycium sandvicence A. Gray.

Photo by C. Skottsberg

Sophora toromiro (R. A. Phil.) Skottsb.

6. Freshwater Algæ from Juan Fernandez and Easter Island.

By

K. MÜNSTER STRÖM.

With 1 textfigure.

The material, upon which the present contribution to the flora of Juan Fernandez and Easter Island is based, was collected by Professor Dr. C. SKOTTSBERG during the Swedish Expedition to the Pacific 1916—1917.

Numerous samples were collected; partially they were preserved in bottles, partially they were dried up.

On the whole, I have examined 28 samples preserved in chemicals and about 25 dried ones. Only very few came from Easter Island. The collection was very kindly submitted for my inspection by Prof. SKOTTSBERG and forwarded to Christiania.

Very little is previously known concerning the freshwater flora of these islands, but unfortunately the present collections were so poor that only twenty-five species were observed, among them only two Desmids.

I therefore very much regret being unable to give any account of the geographical relationship of the freshwater microflora to that of other countries. A thorough examination of the Freshwater Algæ of these Islands would no doubt be of interest, as it may help to supply the phyto- and zoögeographical results, made out from the examination of the higher plants and of the fauna.

Probably, the extreme poverty of the samples is partly due to the fact that they were collected by a non-specialist, but there are reasons to believe that the Islands are not very rich in Freshwater Algæ. This may be due to many causes (there does not exist a single lake or pond in Juan Fernandez); perhaps the lonely position of the islands is of some significance.

I am, however, inclined to believe that at least a greater number of subaërial Algæ may be found by future explorers as the climate of the higher parts of Juan Fernandez is very damp.

The majority of the Algæ are wholly ubiquitous species, even the two Desmids are widely distributed forms. I have, however, mentioned the area of

distribution when dealing with each species in the following account, in conformity with the other contributions to this work.

Only in a few cases I have mentioned the names of the collecting-places proper, as they are of very little interest when such scarce material is investigated, but often I have made use of Prof. SKOTTSBERG's notes on the conditions under which the Algæ grew.

The number of species may be apportioned as follows.

Chlorophyceæ		12.	PROTOCOCCALES	1.	
CONJUGATÆ	5.		Myxophyceæ		13.
OEDOGONIALES	1.		COCCOGONEÆ	2.	
CLADOPHORALES	3.		HORMOGONEÆ	11.	
CHÆTOPHORALES	2.		Total		25.

As to be seen from this, the number of species in the Myxophyceæ was relatively large. The ecological groups of Algæ, which were best represented were the Algæ of wet and dripping rocks, and a few strictly subaërial ones.

Finally I wish to express my best thanks to Professor Dr. N. WILLE for kindly giving me his opinion on some critical species.

Systematic account of the species observed.

Class Chlorophyceæ.

Order Conjugatæ.

Family **Desmidiaceæ.**

Genus **Cosmarium** Corda.

1. **Cosmarium subspeciosum** Nordst.

NORDSTEDT: Desm. Arctoæ. W. & G. S. WEST: British Desmidiaceæ Vol. III.

After due consideration I have referred the specimens observed to this species. Many of them closely resemble *Cosmarium binum*, but in no case could I observe the characteristic and indispensable markings. The nature of the central tumour furnished with the vertical granulate ridges in *Cosmarium binum* must be regarded as the essential distinguishing feature.

Moreover, the measurements and the number of crenations on each semicell are in accordance with the typical form of *Cosmarium subspeciosum*. The crenations are by no means regularly binate granulated. All these characters serve to distinguish the species.

However, the specimens observed at a first glance so much resemble certain forms of *Cosmarium binum* that the two species may be easily confused, when dealing with such forms as the present.

Size: long. 41—46 μ; lat. 29—33 μ; lat. isthm. 12—15 μ; crass. 24 μ.
Masatierra: among mosses on wet rocks in Pangal.
Area of distribution: probably ubiquitous, known from Europe, Arctic Countries, Asia, Africa, North and South America.

2. **Cosmarium humile** var. **striatum** (Boldt) Schmidle.

Schmidle: Beitr. Alpin. Algen; *Cosmarium striatum* Boldt: Siber. Chloroph.; W. & G. S. West: British Desmid. Vol. III.

This Desmid is represented with a few specimens in the same sample as the preceding. The forms are typical of the variety.
Size: long. 15 μ; lat. 12 μ; lat. isthm. 4 μ.
Masatierra.
Area of distribution: Europe, Asia, North and South America, but probably even more widely distributed.

Family **Zygnemaceæ.**

Genus **Zygnema** Ag.

3. **Zygnema** sp.

Sterile specimens of *Zygnema* are present in a couple of samples.
Masatierra: in a brook. *Masafuera:* in a brook with slowly running water.
Distribution of the genus: ubiquitous.

Genus **Spirogyra** Link.

4 & 5. **Spirogyra** sp.

At least two sterile species of *Spirogyra* were observed. The one was a large form 70—80 μ broad, the other a slender species.
Masatierra: Colonial Valley; *Masafuera; Easter Island.*
Distribution of the genus: world-wide.

Order **Oedogoniales.**

Family **Oedogoniaceæ.**

Genus **Oedogonium** Link.

6. **Oedogonium** sp.

Specimens of Oedogonium are widely distributed in all the islands, but invariabily they were sterile.
Masatierra; Masafuera; Easter Island.
Distribution of genus: world-wide.

Order **Cladophorales.**

Family **Cladophoraceæ.**

Genus **Cladophora** Kuetz.

7. **Cladophora fracta** (Dillw.) Kuetz.

KUETZING: Phycol. German.; *Conferva fracta* DILLWYN: British confervæ.

Some of the samples examined consist of this species, which together with *Cladophora glomerata* is among the most widely distributed Algæ in the world. Between the branches of some specimens there is a rich vegetation of Diatoms.

Masatierra.

Area of distribution: ubiquitous.

8. **Cladophora** sp.

Masatierra. Undeterminable *Cladophora*-species are present in a couple of collections.

Distribution of the genus: ubiquitous, both freshwater and marine.

Genus **Rhizoclonium** Kuetz.

9. **Rhizoclonium hieroglyphicum** (Ag.) Kuetz.

KUETZING: Phyc. Gener.; *Conferva hieroglyphica* AGARDH in Flora 1827.

Masatierra: This common species occurred in a few samples.

Area of distribution: ubiquitous.

Order **Chætophorales.**

Family **Trentepohliaceæ.**

Genus **Trentepohlia** Martius.

10. **Trentepohlia aurea** L.

LINNÉ: Systema Naturæ *(Byssus aureus).*

Masatierra: The typical form of this species, which is among the most widely distributed Algæ in the world, was common in caves.

Area of distribution: world-wide.

11. **Trentepohlia aurea** ? forma.

Forma in PRINTZ: Subaërial Algæ from South Africa. Det Kgl. Norske Videnskabers Selskabs Skrifter 1920. Trondhjem 1921.

The form observed very much resembled the *forma* recorded by PRINTZ from South Africa. The filaments were a little broader (breadth from 10 to 15 μ) but he also mentions specimens up to 17 μ.

I quite agree with Dr. PRINTZ in regarding the difference between *Trentepohlia aurea* and *Trentepohlia abietina* as insufficient for specific separation. The reasons for this, put forward in his paper seem very convincing. Previously a couple of *Trentepohlia* species are known to occur in Juan Fernandez and Easter Island, such as *Trentepohlia polycarpa* and the doubtful *Trentepohlia Tuckermanniana*.

Masatierra: in caves, Cumberland Bay.

Area of distribution: previously only known from South Africa.

Order **Protococcales.**

Family **Protococcaceæ.**

Genus **Chlorella** Beijerinck.

12. **Chlorella ellipsoidea** Gern.

GERNECK: Z. Kenntn. nied. Chlorophyceen.

The specimens, which occurred in considerable quantities, were all very badly preserved and the cytological structure could not be observed with accuracy. To judge from their size, however, they seem to belong to *Chlorella ellipsoidea* Gerneck and certainly they come nearer to this than to any other species of the genus.

Masatierra: forming green, slimy masses on rocks in cave.

Area of distribution: hitherto only reported from a few countries, mostly from cultures in laboratories, but undoubtedly of wide distribution.

Class **Myxophyceæ.**

Order **Coccogoneæ.**

Family **Chroococcaceæ.**

Genus **Chroococcus** NAEGELI.

13. **Chroococcus minor** (Kuetz.) Naeg.

NAEGELI: Gatt. Einz. Alg.; *Protococcus minor* KUETZING: Species Algarum.

The specimens observed were few and in no good state of preservation. I have compared them with the original ones in the herbarium of NAEGELI

and there can be no doubt about the identification. They were quite similar to the forms of the species so frequently found throughout Europe.

Masatierra: in caves.

Area of distribution: world-wide.

Genus **Gloeocapsa** Kuetz. em. Naegeli.

14. **Gloeocapsa montana** Kuetz.

Kuetzing: Phycol. generalis, incl. *Gl. polydermatica* and *Gl. quaternata.*

Masatierra: This common species occurred in a single sample, scattered among specimens of *Nostoc sphæricum.*

Area of distribution: ubiquitous.

Order **Hormogoneæ.**

Family **Stigonemaceæ.**

Genus **Stigonema** Agardh.

15. **Stigonema turfaceum** (Berk.) Cooke.

Cooke: British Freshwater Algæ; Berkeley in English Botany tab. 2826.

Masatierra: The typical form of this characteristic species occurred in one sample, collected on rocks and forming a nigro-pulvinate stratum.

Size: Crass. 25—38 μ; Crass. horm. 12 μ; Long. horm. 45 μ.

Area of distribution: ubiquitous.

16. **Stigonema tomentosum** (Kuetz.) Hieron.

Hieronymus in Hedwigia 1895; *Sirosiphon tomentosus* Kuetzing in Bot. Zeit. 1847; Rabenhorst: Exsicc. No. 694, etc.

Masafuera: on rocks. This distinct species is represented with its typical form in a single sample.

Area of distribution: probably ubiquitous.

Genus **Diplonema** Borzi.

17. **Diplonema rupicolum** Borzi.

Borzi: Studie sulle Mixoficee II.

I am in some doubt if the species observed is quite identical with Borzi's species.

The specimens, however, very much resemble his figures of *Diplonema rupicolum,* and the false branches are exactly like those. The dimensions, moreover, are quite the same as recorded by him, and I have observed the curious chroococcoïd stage which occurred interiorly in the frond.

To judge from his drawings the species presents a considerable range of variation and certainly the Myxophycea observed comes nearer to *Diplonema rupicolum* than to any other species.

Masatierra: on rocks in cave.

Area of distribution: previously only known from Italy.

Family **Nostocaceæ.**

Genus **Nostoc** Vaucher.

18. **Nostoc sphæricum** Vaucher.

VAUCHER: Hist. Conferves d'eau douce.

The determination is not perfectly sure as neither heterocysts nor spores could be found. However, the macroscopical appearence and the characters of the vegetative cells are facts so strongly supporting the determination that there can be very little doubt concerning the identification of the specimens.

Masatierra.

Area of distribution: world-wide.

19. **Nostoc ellipsosporum** (Desmaz.) Rabh.

RABENHORST: Flora Europ. Alg.; *Hormosiphon ellipsosporus* DESMAZIÈRES: Pl. crypt. de France; WITTROCK & NORDSTEDT: Exsicc. 1329.

Masafuera: The typical form of this species was observed in a single sample, collected on damp soil between Hepaticae.

Size: Long. cell. 7—12 μ; lat. cell. 4 μ; lat. heterocyst. 6—7 μ; long. heterocyst. 7—13 μ; long. spor. 12—19 μ; lat. spor. 6—8 μ.

Area of distribution: probably ubiquitous.

Family **Oscillatoriaceæ.**

Genus **Lyngbya** Ag.

20. **Lyngbya** sp.

Masatierra: among other Algæ. The species was undeterminable as only a couple of filaments were observed.

Distribution of the genus: world-wide.

Genus **Phormidium** Kuetz.

21. **Phormidium Retzii** (Ag.) Gom.

Gomont in Journ. de Botanique IV; Agardh: Disp. Alg. Suec.

The form observed no doubt belongs to this species, but presents some likeness to *Phormidium ambiguum*.

Size: lat. fil. 6—7 μ.

Masafuera: forming a stratum in waterfall.

Area of distribution: ubiquitous.

22. **Phormidium uncinatum** (Ag.) Gom.

Gomont in Journ. de Botanique IV; *Oscillatoria uncinata* Agardh in Flora X; Wittrock & Nordstedt: Exsicc. No. 96, »Phormidium membranaceum».

Masatierra: The typical form was observed in a single sample.

Area of distribution: world-wide.

Genus **Oscillatoria** Vaucher.

23. **Oscillatoria tenuis** Ag.

Agardh: Alg. Dec.

Masatierra: This common species was present in one sample, from wet rocks in Pangal.

Area of distribution: one of the most generally distributed Algæ in the world.

24. **Oscillatoria** sp.

? *Oscillatoria terebriformis* forma *tenuis* W. & G. S. West: Freshwater Algæ. British Antarctic Expedition 1907—9.

In one sample there was an Oscillatoria, which presented a striking similarity to the *forma tenuis* described by Messrs. West from the Antarctic. The

Fig. 1. Ca. 1,000 ×.

dimensions were just the same, and also the cytological structure as far as it could be observed (the specimens were preserved in formaline solution), but the filaments were very little, if at all, terebriform. However, if to judge from Messrs. West's figures, this character is not very striking in the specimens

they observed from the Antarctic, and certainly my specimens come very near to this form.

Size: lat. fil. 3 μ.

Masatierra: On freshwater sponges.

Area of distribution: The above-mentioned form is previously known from Cape Royds, Victoria Land.

Addenda.

25. **Nostoc punctiforme** (Kuetz.) Hariot.

HARIOT in Journ. de Bot. 1891; *Polycoccus punctiformis* KUETZING Phyc. gen.

This *Nostoc* occurred in the intercellular spaces of three *Gunnera*-species. The specimens are quite like those collected by LAGERHEIM in Equador and issued in WITTROCK, NORDSTEDT & LAGERHEIM: Algæ exsiccatæ 1338.

Masatierra: in *Gunnera peltata* Phil. and *Gunnera bracteata* Steud.

Masafuera: in *Gunnera Masafueræ* Skottsb.

Area of distribution: World-wide.

Christiania, The Botanic Museum of the Royal Fredericks University.

April 27th, 1921.

7. The Phanerogams of the Juan Fernandez Islands.

By

CARL SKOTTSBERG.

With 11 plates (nos. 10—20) and 39 text figures.

The compilation of a phanerogamic flora of Juan Fernandez has required more time and labour than could be anticipated. The general belief was, I dare say, that the higher flora of the group was very well known. That the writer did not share this opinion is evident from the fact that floristic investigation was one of the principal objects of the voyage in 1916—17. My short visit in 1908 made me believe that the remote island of Masafuera was a promising field of research. The results communicated below will show, I think, that I was not disappointed. Masatierra, where quite a number of botanists have been, had more in store for us than we expected. There were many places of difficult access only visited by BERTERO, eighty years ago. Our knowledge of the distribution of the species in the islands was, in many cases at least, quite vague, as the earlier collectors seldom recorded the exact localities on their herbarium labels. Several species had been found once or twice only and remained little known.

The starting point for my studies was of course the well known work of F. JOHOW. But I had not advanced very far when I found that a reexamination of many of the types was urgently needed. The majority of these had been discovered by BERTERO, and the discrepance between the writer and JOHOW concerning several of the species is partly due to the fact that JOHOW had no occasion to study BERTERO's specimens. In other instances his species conception is a little too wide. I found it necessary to examine practically every type of the endemic plants. The collections of Santiago (GERMAIN, PHILIPPI, REED a. o. in the herbarium of Museo Nacional, and JOHOW's private collection) and Kew (DOUGLAS, SCOULER, BERTERO, DOWNTON, MOSELEY a. o.) were studied during longer visits to these places; other material was kindly sent for inspection from Berlin, Kew, Paris, Lund, Stockholm and Upsala.

As usual, several collegues have assisted me in the determination of my plants. Dr. R. PILGER, Berlin-Dahlem, revised the Gramineae in collaboration with the writer, Dr. C. LINDMAN, Stockholm, determined some Poae, Rev. Dr.

G. KÜKENTHAL, Coburg, revised the Cyperaceae, Dr. G. BITTER, Bremen, made a special study of Solanum, Acaena and Margyricarpus, Mr. O. E. SCHULZ, Berlin, gave me his opinion on Cardamine, Dr. F VIERHAPPER communicated some notes on my collection of Erigeron, and Dr. H. DAHLSTEDT, Stockholm, described a new form of Taraxacum. To all these gentlemen I wish to express my heartiest thanks for their generous assistance. I also thank Mr. A. KARNELL, Gothenburg, for the help he gave me when preparing the negatives of Plates 10, 11, 15 and 17.

Finally, I use this occasion to thank my wife, Mrs. INGA SKOTTSBERG, for her never failing enthusiasm and her self-sacrifice during a voyage that was a great strain on body and mind alike. She was a most skilful, active and cheerful companion, and contributed largely to the good results of our survey.

The localities in Masatierra are enumerated from E. to W. along the north and south sides of the island, respectively; in the case of Masafuera, they are enumerated from N. to S. along the east coast and thence round to the west coast, and followed by the observations in the high mountainous region. Spanish names are used, with the following abbreviations: B. = Bahía, bay; C. = Cordón, mountain ridge; Co = Cerro, mountain, peak; Pta = Punta, cape; Pto = Puerto, cove, harbour; Q. = Quebrada, valley with steep sides, gorge, canyon; V. = Valle, valley. Maps will accompany vol. I.

Where a collector's or observer's name is not mentioned, the species has been observed by us in all the places quoted. The numbers in brackets refer to our collection, of which sets are kept in Stockholm (Riksmuseum), Gothenburg (Botanical Garden), Upsala (Museum of the University), and in several foreign herbaria.

A ! after the name of a collector signifies that I have examined the specimen referred to.

An * before a latin name indicates a new addition to the flora of Juan Fernandez; if before the name of one of the islands, it signifies that the species was observed for the first time in the island in question.

The altitudes are in meters above sea level.

It has been found advisable to indicate the state in which the specimens were collected: fl. = in flower, fr. = with fruit. Other abbreviations will be understood without further explanation.

All the illustrations in the text are reproduced after drawings made by the writer.

C. Skottsberg.

I. Indigenous species.

Gramineae.

Stipa L.

1. **S. fernandeziana** Phil. Anal. Univ. XLIII.560. — Syn. *S. bicolor* in JOHOW, Estud. 134 non Vahl; *S. Skottsbergii* Pilger ex SKOTTSBERG, Stud. 22. — Fig. 1 a—d.

On dry treeless slopes, also in many places along the high rocky ridges; an important grass in the western half of Masatierra and in the basal region of Masafuera.

Masatierra: GERMAIN! PHILIPPI! — High peak between the colony and Pangal, 365 m; V. Colonial, not uncommon (fl. $^{5}/_{12}$ 16, no. 19); Portezuelo de Villagra, 590 m (fl. $^{3}/_{12}$ 16, no. 28); C. Salsipuedes (fl.—fr. $^{8}/_{12}$ 16, no. 90, $^{20}/_{12}$ 16, no. 170); Q. Juanango; between Villagra and Pta Larga, in many places, but not abundant (fr. $^{6}/_{1}$ 17, no. 244).

Masafuera: Probably in all the valleys; Q. Seca, abundant; Q. de las Casas, very common to a couple of hundred m inland; Q. de las Vacas, abundant in the outer parts (fr. $^{10}/_{2}$ 17, no. 447).

Leaves to 4 or 5 mm broad, generally convolute, densely pubescent below, glabrous or with few hairs above. Rays of the panicle about 6-flowered. Empty glumes very acute, outer 3-, inner 5-nerved, brownish purple with translucent margins and point, 14—15 mm long in my specimens. Pedicel of flower 3—3,5 mm, densely silky with longer hairs on the ventral side. Floral glume 7 mm long, with 5 prominent nerves, dorsal line pubescent to about $^{2}/_{3}$ of its length, thence glabrous; external face covered with acute papillae; collar 1 mm high, brownish purple, the edge with a crown of white hairs about 1 mm long, but shorter on the ventral side; awn to 70 mm, slightly geniculate or almost straight, laxly twisted and pilose in the lower half, thence scabrous. Lodicules about 1,1 mm, ovate-truncate. Palea nearly 2 mm long, ovate-lanceolate, acutate, nerveless. Stamens dimorphous, the anterior with normal anther, 1 mm long, linear, fertile, the others with more ovoid, $^{1}/_{3}$—$^{1}/_{2}$ mm long, almost entirely sterile anthers. Anthers sometimes aristulate. Ovary about 1 mm long, fusiform, stigmas short pedicellate. Flowers cleistogamous.

This species was listed as *S. manicata* Desv. by PHILIPPI, Bot. Zeit. XIV.630, but distinguished as var. *hirsuta* on the label of GERMAIN's specimen in Herb. Santiago, collected Oct. 1854 in Masatierra. Later PHILIPPI, who collected the same species in Nov. 1864, described it as *S. fernandeziana* Phil. A comparison with the type showed that all my material must be referred to PHILIPPI's species; his plants, however, differ from mine in the empty glumes reaching a length of 21 mm while the awn is as much as 90 mm long.

It is not at all remarkable that PHILIPPI at first regarded the island *Stipa* as a variety of *S. manicata.* I have not seen authentic material of the latter, but to judge from the detailed description in GAY, Bot. VI.288, it must come very near this. *S. manicata* differs by the shorter leaves, which are hairy on the inside and glabrous on the outside, the longer ligule, the shorter glumes, described as green below, the shorter pedicel of the flower, shorter awn etc. The anthers seem to be alike in both.

As only one *Stipa* has been collected in the islands by all visitors known to me, it seems natural to identify *S. Neesiana* var. *fernandeziana* Trin. et Rupr. with *S. fernandeziana* Phil., but the description »foliis planiusculis cum nodis glabris ligula 1 $^{1}/_{2}$-lineali» does not answer to any form seen by me in the islands or in herbaria. My specimens of *S. Neesiana* from Central Chile (no. 1017), determined by Prof. PILGER, are glabrous and have smaller spikelets than *S. fernandeziana.* Prof. PILGER was inclined to regard the latter as identical with

S. longiflora Steud Syn. I. 124, of which there is a sheet in Berlin (BERTERO no. 800). But the description of STEUDEL clearly forbids the identification. The leaves are 1 mm wide only, the rays of the panicle bear 1—3 flowers, the glumes are 5-nerved and only 6 to 8 mm long, the »floscule» is described as pilose all over. I collected a *Stipa* near Valparaiso (no. 1019), that answers very well to STEUDEL's description, and this is not *S. fernandeziana*. I have no reason to doubt that *S. fernandeziana* is the same as *S. longiflora* Herb. Berlin, for STEUDEL quotes BERTERO no. 800 *ex parte* for his species. Prof. PILGER thinks that *S. macrathera* Phil. Anal. Univ. XCIII.720 is another name for *S. fernandeziana*. The description is incomplete, and I have no authentic specimen at hand.

S. fernandeziana Steud. l. c. was shown by PILGER ex SKOTTSBERG, Stud. 22 to be = *Piptochaetium bicolor*.

My identification of *S. Skottsbergii* Pilger l. c. with *S. fernandeziana* Phil. was approved by the author of the former. There is a certain variation in the leaves, probably due to external conditions. The same kind of variation is found in *Piptochaetium bicolor*.

Area of distribution: Central Chile; Juan Fernandez.

Piptochaetium Presl.

2. **P. bicolor** (Vahl) Presl. — JOHOW, Estud. 125. — Syn. *Oryzopsis bicolor* Speg., SKOTTSBERG, Stud. 22; *Stipa bicolor* Vahl, non JOHOW nec HEMSLEY; *S. fernandeziana* Steud. non Phil.

Masatierra: Open ground in the centre of the island, not common. V. Colonial, near the colony (fl.-fr. $^{5}/_{12}$ 16, no. 18) and also higher up (fr. $^{24}/_{12}$ 16, no. 1201); Pto Ingles (fr. $^{19}/_{1}$ 17, no. 315); grassy slopes of Villagra, rather abundant (fr. $^{6}/_{1}$ 17, no. 243).

Area of distribution: South Brazil, Argentina, Chile, Masatierra.

3. **P. laevissimum** Phil. — JOHOW, Estud. 135.

In the lower treeless parts of the valleys, abundant in the western half of Masatierra and in the basal region of Masafuera.

Masatierra: V. Colonial, east part, dry soil near the sea (fr. $^{11}/_{12}$ 16, no. 110); C. Salsipuedes, here and there up to about 600 m; Pto Ingles, common (fr. $^{19}/_{1}$ 17, no. 316); Q. Juanango, very common; between Villagra and Pta Larga, abundant, quite dominating over considerable areas (fr. $^{6}/_{1}$ 17, no. 240).

Masafuera: JOHOW. — Forming extensive mats in the basal region from Toltén to Vacas, south of this valley not so common. It covers the bottom of the outer part of the valleys, as well as the ridges between them, alternating with the forest patches (fr. $^{19}/_{2}$ 17, no. 553).

This grass was first found in Masatierra by PHILIPPI in 1864 and rediscovered in 1908 by the writer. It is, perhaps, the most common of all grasses considered to be indigenous.

Area of distribution: Central Chile (quoted by JOHOW from the Cordillera of Santiago and Colchagua, collected by me near Valparaiso); Juan Fernandez.

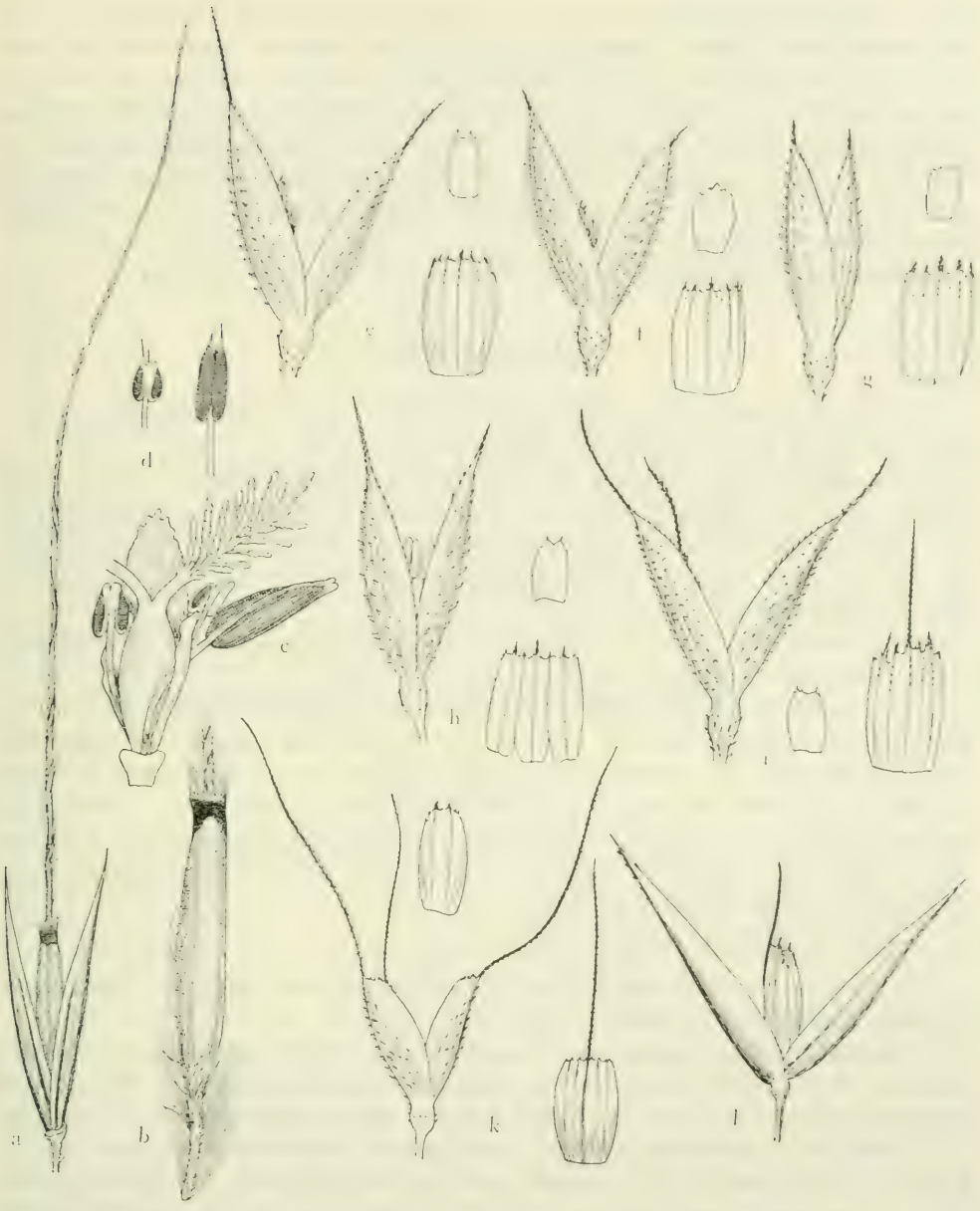


Fig. 1. **a**—**d** *Stipa fernandeziana:* **a** spikelet, × 2½; **b** flowering glume, × 5; **c** flower with palea and two lodicules, × 20; **d** anthers, × 10. **e**—**i** *Polypogon imberbis*, spikelets, flowering glume and palea: **e** leg. REED, **f** SKOTTSBERG no. 298, **g** no. 491, **h** no. 471, **i** f. *aristata* no. 1109. **k** *P. crinitus*, spikelet, flowering glume and palea. **l** *Agrostis masafuerana*, spikelet. — e—l × 10.

Podophorus Phil.

4. **P. bromoides** Phil. — JOHOW, Estud. 135.

Masatierra: GERMAIN!

Discovered by GERMAIN in the latter half of October, 1854. PHILIPPI

states (Bot. Zeit. XIV.649) that it is »frequens in insula Juan Fernandez», but it has never been found a second time. All the material consists of the two sheets in Santiago and a third one in Kew. I need not tell that we made a careful search after this most interesting grass, but unfortunately without result. I must believe that it is a very rare plant. As it was in flower and fruit in October, it may have remained sterile during our permanence (Dec. 1—April 30), and was perhaps confounded with *Bromus* (Megalachne). Still, every suspected grass tuft was examined.

Area of distribution: Monotypic and endemic in Masatierra.

Polypogon Desf.

5. **P. imberbis** (Phil.) Johow, Estud. 136. — Syn. *Nowodworskya imberbis* Phil. Anal. Univ. XLIII.562. — Fig. 1 e—i.

Masatierra: REED! (fig. 1 e). — Dry soil near the sea, in the western section, rare; Pto Ingles (PHILIPPI!); B. del Padre (fl. $^{15}/_{1}$ 17, no. 298, fig. 1 f).

***Masafuera:** near the sea in several places. B. Toltén (fl. $^{2}/_{2}$ 17, no. 471, fig. 1 h); Tierras Blancas, not uncommon (fl.-fr. $^{17}/_{2}$ 17, no. 491, fig. 1 g). — New for Masafuera.

f. *aristata* n. f. A typo differt gluma florali longe aristata. **Masafuera:** Playa Ancha (fl.-fr. $^{12}/_{3}$ 17, no. 1109, fig. 1 i).

A careful comparison with PHILIPPI's material in Herb. Santiago was made. The following notes may be added. Empty glumes $2{,}_{7}-3$ mm long, not counting the awn, the inner generally a little shorter, entire, very acute, scabrous on the back, awn terminal, $0{,}_{5}-2$ mm long; floral glume about 2 mm long, exaristate, sparingly scabrid on the back, 5-nerved with 3 stronger and 2 weaker nerves, each prolonged into a scabrid point; palea about 1 mm, hyaline, ovate, ± truncate and generally 2-pointed.

Area of distribution: Endemic.

6. **P. chilensis** (Kunth) Pilger, Über einige Gram. 386. — *Chaetotropis chilensis* Kunth; JOHOW, Estud. 136.

Masatierra: on open ground in some of the valleys, also in the dry western section. V. Colonial (begin. fl. $^{29}/_{12}$ 16, no. 206); Pto Ingles (fl. $^{19}/_{1}$ 17, no. 317); Q. Juanango (fl.—fr. $^{9}/_{4}$ 17, no. 605); Villagra, not uncommon (fl. $^{5}/_{1}$ 17, no. 239).

Area of distribution: Central provinces of Chile and Masatierra acc. to JOHOW, but apparently also in other parts of South America, for PILGER quotes as synonyms *Vilfa muricata* Presl from Perú and *Agrostis pectinata* Hackel et Arechavaleta from Uruguay. It was perhaps introduced to Masatierra with the traffic of the 18th century.

Agrostis L.

*7. **A. masafuerana** Pilger, Über einige Gram. 388. — Fig. 1 l.

Masafuera: in the alpine fell-fields, very local; Las Torres, 1370 m (past fl. $^{14}/_{2}$ 17, no. 424); C. del Barril, 1290 m. — An addition to the magellanic element.

Area of distribution: Endemic in Masafuera.

Trisetum Pers.

8. **T. chromostachyum** Desv. — JOHOW, Estud. 137.

Masatierra: GERMAIN! REED! — In my previous paper on the islands I excluded this from the list of indigenous species. There are, however, no special reasons to regard it as introduced. It must be rare, and we never found it.

Area of distribution: Central and South Chile; Masatierra.

Danthonia DC.

9. **D. collina** Phil. — JOHOW, Estud. 138. — Fig. 2 a.

Masatierra: PHILIPPI! — Dry rocky ridges and sunny arid slopes; the peak between Pangal and V. Colonial, 365 m (past fl. $^{17}/_{12}$ 16, no. 148); Q. Damajuana (fl. $^{6}/_{12}$ 16, no. 52); C. Salsipuedes, dry, wind-exposed rocks, not uncommon; Pto Ingles (fr. dispersed, $^{19}/_{1}$ 17, no. 328); Villagra, frequent on the dry slopes (SKOTTSBERG 1908; fl.-fr. $^{6}/_{1}$ 17, no. 247).

First found by PHILIPPI and rediscovered (sterile) by the writer in 1908. As there are so many American species of this genus I have thought it better to add a few figures for comparison.

Area of distribution: South Chile (Valdivia); Masatierra.

Koeleria Pers.

10. **K. micrathera** (Desv.) Griseb. Symb. Fl. Argent. 292. — Syn. *Trisetum micratherum* Desv. ex GAY, Bot. VI.352; *T. laxum* Phil. Anal. Univ. XLIII.568, JOHOW, Estud. 137; PILGER, Über einige Gram. 387. — Fig. 2 b—h.

Masatierra: PHILIPPI! — Rocky places near Portezuelo de Villagra, in brushwood c. 590 m, very scarce (fl. $^{10}/_{1}$ 17, no. 279).

I have not seen the type of *Trisetum micratherum,* to which *T. laxum* is referred on the authority of Prof. PILGER; according to the description the former has much shorter leaves (only 2—3 inches), pubescent sheaths, outer glume $^{2}/_{3}$ as long as the inner, etc., but these differences disappear, it seems, at a closer look, for PILGER writes l. c. 388: »Die Skottsbergschen Exemplare stimmen mit denen von Valdivia durchaus überein». If the plant from Argentina belongs here is an open question.

In his monograph of *Koeleria,* Bibl. Bot. 65, DOMIN calls *K. micrathera* a »mixtum compositum». He had seen PHILIPPI's specimens from Valdivia and concludes that they must belong to some other genus. His reason for excluding it from *Koeleria* evidently is that, as it is perennial and caespitose, it belongs to the subgenus *Airochloa,* but all the Airochloas have much larger anthers. The annual *Lophochloa* species have smaller anthers. Thus, it takes an intermediate position. There is no other genus where we could find a suitable place for it, and a new genus could not very well be based only on the small size of the anthers.

A short description of the insular plant will perhaps be welcome.

Densely caespitose but slender, dull green. Leaves to 30 cm long, only 1,5—1,7 mm wide, plicate; sheath glabrous, blade nearly glabrous, with few, long and thin hairs; ligule almost wanting, transition between sheath and blade pilose. Culm with few leaves. Panicle 5—10 cm long, multiradiate, contracted; spikelets numerous, short pedicellate, with two complete flowers and a third, terminal, rudimentary one, pilose as the rhachis. Empty glumes acute, very unequal, lower c. 2 mm long, narrow lanceolate, 1-nerved, upper about twice as long, broad lanceolate, 3-nerved, floral glume 5—6 mm long with broad hyaline margin, shortly bifid with oblique triangular lobes, 3-nerved, with scabrid keel; awn subterminal, 1—1,5 mm; palea 3 mm long, oblanceolate, acutely bidentate, 2-keeled with scabrid keels. Anthers 0,5—0,75 mm long.

Area of distribution: South Chile (Valdivia); Masatierra.

Bromus L.

Megalachne, hitherto one of the monotypic insular genera, was reduced to *Bromus* by PILGER, Über einige Gram. 386. The long awns of the empty glumes give a quite characteristic appearance to *Megalachne,* but, as PILGER emphasizes, this character alone is not sufficient to separate the two genera. HEMSLEY, Chall. Rep. Bot. I: 3.63 found that *Megalachne* might be distinguished by the glabrous ovary and the three styles. But while the young ovary is glabrous or nearly so, older stages show rigid hairs covering its apex and surrounding the styles. And the new species, discovered by the writer, has *two* subapical styles, so that little can be advanced against PILGER's view. On the other hand, three styles are reported to occur in the section *Ceratochloa.* On account of the heavily awned empty glumes, *Megalachne* should be retained as a special section of *Bromus.*

11. **B.** *(Megalachne)* **fernandezianus** (Phil.) Skottsb. — Syn. *M. Berteroniana* Steud. Syn. I. 237, JOHOW, Estud. 140; *Pantathera fernandeziana* Phil. Bot. Zeit. XIV.649; *B. megalachne* Pilger l. c. — Fig. 2 i.

Masatierra: Not uncommon in the eastern and central parts, along the ridges in the montane region, in open glades of the woods, among brushwood etc., hanging down from the rocks and forming quite ornamental patches. — Pto Frances, Loma del Incienso, 360 m, common; El Pangal, on the steep slopes from 250—300 m, also in wet moss by the waterfall; in the gap between Damajuana and Yunque, 580 m (fl. $^{18}/_{12}$ 16, no. 155); V. Colonial, C. Central, c. 570 m; Q. del Monte Maderugo, steep wall, 390 m; Portezuelo de Villagra, common on the ridges, 5—600 m (fl. $^{3}/_{12}$ 16, no. 30); C. Salsipuedes, 400—600 m, common; Q. Juanango, by the stream, 215 m; B. Villagra, low hill near the camp, c. 200 m.

Masafuera: in the same kind of places as in Masatierra, but less frequent. Q. de las Casas (JOHOW), not uncommon on the walls of the gorge, (past fl. $^{11}/_{2}$ 17, no. 456); Q. de las Vacas (JOHOW); Q. Angosta, at the waterfall; Q. del Varadero; Q. de la Lobería, along the stream in the forest, 170 m; Las Torres, wet moss mats on the rocks, 1370 m (forma! past fl. $^{14}/_{2}$ 17, no. 425); C. del

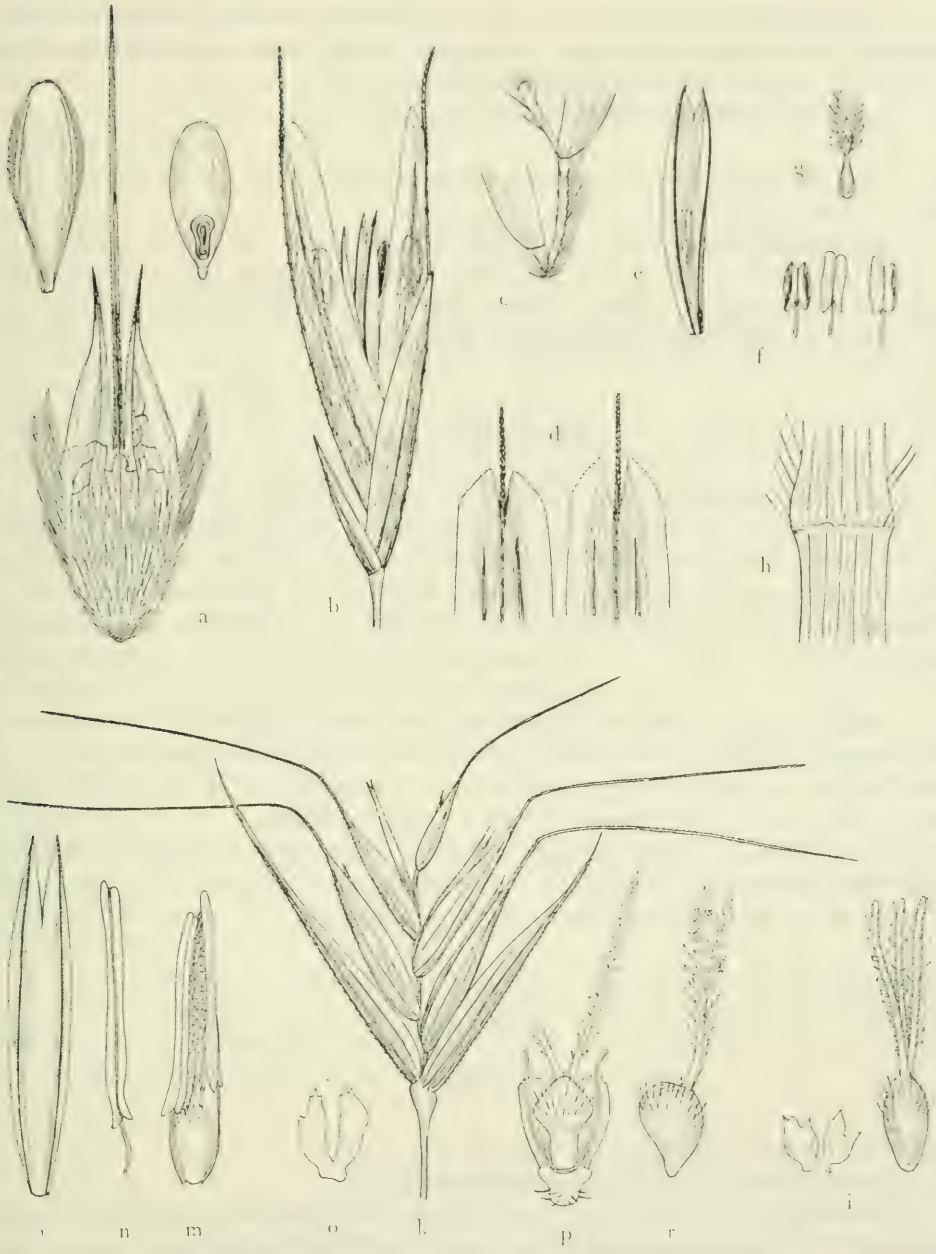


Fig. 2. **a** *Danthonia collina,* flowering glume with palea and caryopsis, × 5. **b—h** *Koeleria micrathera:* **b** spikelet, **c** rhachis with rudimentary flower, **d** tips of two flowering glumes, **e** palea, **f** anthers, **g** pistil, all × 10, **h** ligule, × 12½. **i** *Bromus fernandezianus,* pistil and lodicules, × 10. **k—r** *B. masafueranus:* **k** spikelet, × 2½, **l** palea, **m** pollination, **n** anther, all × 5; **o** lodicules, **p** flower, **r** pistil from the side, all × 10.

Barril, 985 m; lower slopes of Los Inocentes, open space in fern forest, c. 950 m. — No. 425 differs from the ordinary form in having more scabrid glumes; the spikelets are unusually large, about 6-flowered.

PILGER made the new name *B. megalachne* in order to avoid confusion between *B. Berteronianus* and *B. Berterianus* Colla. But there is no reason why we should not use PHILIPPI's specific name.

Area of distribution: Endemic.

*12. **B.** *(Megalachne)* **masafueranus** Skottsb. et Pilger ex PILGER, Über einige Gram. 385. — Fig. 2 k—r.

Masafuera: Las Torres, on rocks, 1370 m (fl.-fr. $^{14}/_{2}$ 17, no. 415).

An interesting addition to the flora. The description l. c. is supplied here with some illustrations. The flowers are cleistogamous (see fig. 2 m).

Area of distribution: Endemic in Masafuera.

Chusquea Kunth.

13. **Ch. fernandeziana** Phil. — JOHOW, Estud. 141.

Masatierra: in the forest belt, rare below 400 m, more common higher up, but never abundant nor forming thickets comparable with the famous chilean »colihuales»; also in dense brushwood on the high peaks and crests. — C. Chifladores, slope of the Frances Valley, c. 500 m (no. 621); main ridge above Pangal, 795 m; north side of Damajuana, 530 m and in the quebrada below, west side, 345 m (no. 212); V. Anson, slopes of Co Yunque; Co Pirámide, on rock ledges, 550—600 m; V. Colonial, Q. Gutierrez, c. 450 m, in dense forest; Pto Ingles, in higher ground; Co Alto (P. GUTIERREZ); mountain spur west of Co Yunque, 415 m; Q. Villagra, just below Portezuelo, and by the stream farther down, 160 m; Q. de la Choza, c. 300 m, not uncommon.

The colihue did not flower during our permanence, nor was it fertile in 1908. Flowers are known from the type material only (coll. Nov. 1864, PHILIPPI!)

Area of distribution: Endemic in Masatierra.

Cyperaceae.

Cyperus L.

14. **C. vegetus** Willd. — JOHOW, Estud. 142.

Moist places, generally near the sea.

Masatierra, only reported from the central and western sections: El Pangal (JOHOW); V. Colonial (past fl. $^{29}/_{12}$ 16, no. 202); Pto Ingles, by the stream near the sea; B. Chupones.

Masafuera: GERMAIN. — Rocky coast between Casas and Vacas (fl.-fr. $^{13}/_{2}$ 17, no. 426); near Las Chozas; Lobería vieja, on the beach.

Area of distribution: Chile; Juan Fernandez; Easter Island.

15. **C. reflexus** Vahl. — JOHOW, Estud. 142.

Masatierra: reported by SCOULER, BERTERO, GERMAIN, REED, MOSELEY and JOHOW, by the last mentioned from B. Cumberland. We did not see it.

JOHOW united *C. fernandezianus* Colla with *C. reflexus*. CLARKE retained it as a species under *Pycreus*, because the stigma was described as bifid, but he had not seen specimens. It is a very dubious species.

Area of distribution: Mexico and Texas to extratropical South America; Chile; Masatierra.

Scirpus L.

16. **S. nodosus** Rottb. — JOHOW, Estud. 142.

Masatierra: In some places near the sea, but more often seen on open, devastated ground or on the high ridges, always local and only collected before by PHILIPPI, MOSELEY and the writer (1908). — El Pangal, west branch, on barren slopes; V. Colonial, near the road to Portezuelo, 325 m; C. Salsipuedes, edge of the forest c. 600 m (fl. $^{20}/_{12}$ 16, no. 174); Pto Ingles, on the beach and on the central ridge; Q. Juanango; Q. Villagra, not uncommon (past fl. $^{5}/_{1}$ 17, no. 238), and westward to B. Chupones.

Masafuera: CUMING! JOHOW. — Abundant along the east coast from Toltén to Playa Ancha (past fl. Feb. 1917, no. 513).

Area of distribution: Widely dispersed in the south temperate zone, circumpolar.

17. **S. cernuus** Vahl. — SKOTTSBERG, Stud. 23.

Masatierra: Wet places along the coast, first found be the writer in B. del Padre, 1908. — Outer part of El Pangal, mats in the stream (fl. $^{11}/_{12}$ 16, no. 98) and at the waterfall in the bottom of the gorge (fl.—fr. $^{1}/_{1}$ 17, no. 222); B. Cumberland, wet grassy swamps near the sea (fl.—fr. $^{11}/_{12}$ 16, no. 99, fr. $^{29}/_{12}$ 16, no. 1171); Q. Juanango, in the stream; B. del Padre, on the beach; outlet of a small stream near the foot of Co Negro; small stream west of El Yunque; B. Chupones, dry stream bed.

***Masafuera:** Q. de la Lobería (fl.-fr. $^{17}/_{2}$ 17, no. 522). — New for Masafuera.

Very variable in size; no. 222 reaches a length of 40 cm, probably the largest form ever recorded (»culmi 3—18 cm» acc. to CLARKE, Cyper. chil. 28).

Area of distribution: Subcosmopolitan.

Heleocharis R. Br.

18. **H. maculosa** (Vahl) R. Br. subsp. **fuscopurpurea** (Steud.) Kükenth. Cyp. Nov. V. 432. — Syn. *Isolepis fuscopurpurea* Steud., *H. vincentina* Clarke l. c.; *H. melanocephala*, JOHOW, Estud. 143? — Fig. 3 a.

Masatierra: B. Cumberland, grassy swamp along a small stream (fl.-fr. $^{11}/_{12}$ 16, no. 97).

I think REED's specimens, cited under *H. melanocephala* by JOHOW, belong here. CLARKE quotes PHILIPPI no. 51 for Juan Fernandez, but PHILIPPI is not listed as collector by JOHOW, and CLARKE quotes the same number for specimens from Talca in Chile.

var. **irritans** Kükenth. l. c.

Masatierra, outlet of a small stream near the foot of Co Negro, abundant (fl.-fr. $^{7}/_{1}$ 17, no. 231).

Larger, with light yellowish brown spikes. I dare say this is what JOHOW l. c. calls *H. maculosa,* first found by REED and later by JOHOW in B. del Padre, where I have sought for it in vain.

Area of distribution: Subsp. *fuscopurpurea* is known from South Chile and Masatierra, but *H. maculosa* is quoted for the Antilles, Brazil and Chile.

Oreobolus R. Br.

*19. **O. obtusangulus** Gaud.

Masafuera: Los Inocentes, forming large compact cushions, 1375—1500 m (fr. $^{22}/_{3}$ 17, no. 384). — An important addition to the magellanic element.

Area of distribution: Andes of New Granada and Ecuador to Cape Horn; Falkland Islands; Masafuera.

Cladium P. Br.

20. **C. scirpoideum** (Steud.) Benth. et Hook. f. — JOHOW, Estud. 143.

Masatierra: Streams, waterfalls and other moist places in the forest belt, not at all so rare as indicated by JOHOW, but found in many places in the central parts of the island. — El Pangal, by the waterfall, c. 200 m (fl. $^{1}/_{1}$ 17, no. 224; also JOHOW); north-east precipice of Co Damajuana, 500—550 m; the gap between Damajuana and Yunque, abundant on wet rocks, c. 600 m (fl. $^{18}/_{12}$ 16, no. 163); Plazoleta del Yunque (JOHOW); Portezuelo de Vilagra, one specimen just behind the Selkirk tablet, with *Gunnera bracteata* (past. fl. $^{31}/_{1}$ 17, no. 359); C. Salsipuedes, edge of the forest, rare, 630 m (past fl. $^{8}/_{12}$ 16, no. 72); Pto Ingles, central ridge, c. 470 m; Q. Juanango, at the brook, 215 m (fl.-past fl. $^{9}/_{1}$ 17, no. 602); Q. Villagra, wet rocks in the stream, 240 m, 160 m; Q. de la Choza, wet rock in the forest, c. 400 m.

According to KÜKENTHAL, in letter to the writer, this species is nearest related to *C. angustifolium* (Gaud.) Benth. et Hook. f. from Hawaii and Tahiti.

Area of distribution: Endemic in Masatierra.

Uncinia Pers.

*21. **U. brevicaulis** Thouars.

Masafuera: Alpine fell-fields in the northern half of the highland; the Correspondencia Camp, 1130 m ($^{5}/_{3}$ 17, no. 269 b), and a few hundred m north of this place ($^{25}/_{2}$ 17, no. 369 c); Las Torres, on rocks, 1370 m ($^{14}/_{2}$ 17, no. 369). Everywhere with unripe achenes. — Another addition to the magellanic element.

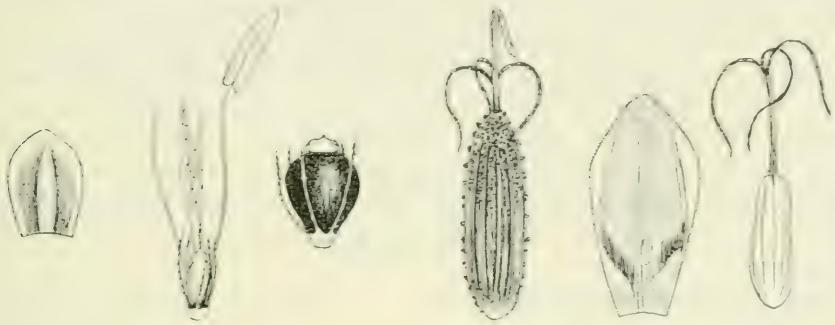
Area of distribution: South Chile, Valdivia to West Patagonia and Fuegia; Masafuera; Andine Patagonia (very rare); Falkland Islands; Tristan da Cunha; St. Paul's and Amsterdam Islands.

22. **U. Douglasii** Boott. — JOHOW, Estud. 144.

Masatierra: Common in the forest belt, in all the valleys from Pto Frances to Q. Juanango, but rarely seen below 200 m; also on the south side of the island; in dense forests or in open glades (fl.-fr. Dec. 1916, nos. 47, 56, 189).

Masafuera: Common in the forest patches and in the damp gorges, 200—500 m, from Q. Sanchez to Q. de la Lobería (unripe fr. Feb. 1917, nos. 463, 487).

Area of distribution: Endemic.



a b

Fig. 3. a *Heleocharis *fuscopurpurea,* bract, × 6, flower and fruit, × 12. b *Uncinia costata,* utricle, bract and pistil, × 6.

*23. **U. costata** Kükenth. Cyp. nov. V. 433. — Fig. 3 b.

Masafuera: Q. Lobería, stony ground in forest, 280 m, with the preceding.

A very distinct species, well separated from *U. Douglasii,* to which it is related.

Area of distribution: Endemic in Masafuera.

*24. **U. phleoides** Pers.

Masafuera: in the fern beds at the Correspondencia Camp, 1130 m, rare (fr. $^{25}/_{2}$, $^{5}/_{3}$ 17, no. 370). — New for Juan Fernandez.

Dr. KÜKENTHAL brought my specimens to var. *nux nigra* C. B. Clarke; this is not a very distinct variety, and part of my material might equally well be classed with the typical form.

Area of distribution: The Andes from Columbia to Patagonia; Chile; Masafuera.

*25. **U. tenuis** Poepp. f. *firmula* Kükenth. Cyp. nov. V. 433.

Masafuera: In the alpine fell fields, probably not uncommon. — Las Torres, 1370 m (fr. disp. $^{14}/_{2}$ 17, no. 1173); C. del Barril, 925—1290 m (fr. $^{1}/_{3}$ 17,

no. 561); Los Inocentes, on the summit, c. 1500 m (fr. $^{9}/_{3}$ 17, no. 382) and on lower slopes, 900 m (fr. $^{22}/_{2}$ 17, no. 1172). — New for Juan Fernandez.

Area of distribution: Costa Rica; Masafuera; South Chilean Andes to Cape Horn; the new form only on Masafuera.

Carex L.

*26. **C. Banksii** Boott.

Masafuera: Alpine fell-fields near Las Torres, 1350—1370 m (fr. $^{14}/_{2}$ 17, no. 393). — New for Juan Fernandez.

Area of distribution: Andes of Santiago; Mendoza; South Chile to Fuegia.

27. **C. Berteroniana** Steud. — Syn. *C. paleata* Boott; JOHOW, Estud. 144.

Masatierra, in the eastern half of the island, not uncommon in the forest belt; Pto Frances (JOHOW), Loma del Incienso, in brushwood, 360 m; C. Centinela, forest patch, c. 300 m; El Pangal, near the waterfall, 200 m; Portezuelo de Villagra, scattered along the ridges (JOHOW; fl.-fr. Dec. 1916, nos. 5, 37); C. Salsipuedes, in thickets (fr. $^{8}/_{12}$ 16, no. 85); Q. Juanango, edge of forest; Q. Villagra (fl. $^{8}/_{1}$ 17, no. 37 b). — Variable in size: 37 and 37 b are slender forms, 5 and 85 very large ones with unusually large female spikes.

Masafuera: GERMAIN! — Q. de las Casas, not uncommon in the canyon (fr. $^{11}/_{2}$ 17, no. 453); Q. del Blindado, 440 m in the forest; Q. Angosta; Q. de la Lobería, open forest, 280 m.

Area of distribution: Endemic.

Palmae.

Juania Drude.

28. **J. australis** (Mart.) Drude. — JOHOW, Estud. 145. — Fig. 4.

Masatierra: Through the whole of the forested region, not seen by us at a lower altitude than 190 m but reaching the highest crests. As was stated

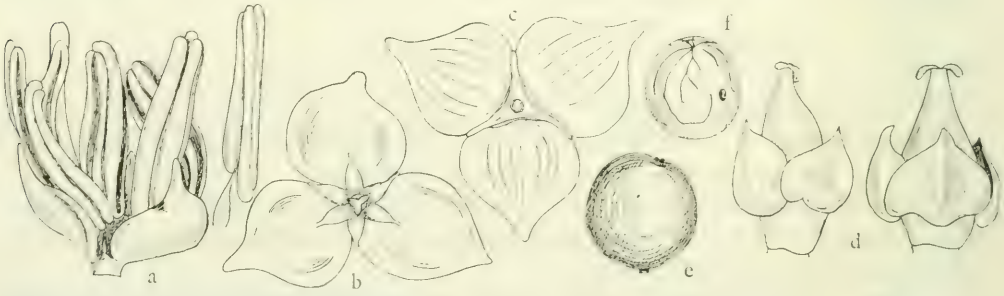


Fig. 4. *Juania australis:* a ♂ fl. and one stamen, b inside of same, anthers removed, c outside of same, d ♀ fl., all × 4; e fruit, $^{4}/_{5}$ nat. size; f seed, × $1\,^{1}/_{5}$.

by JOHOW, *Juania* is not at all on the verge of extinction, but it is true that it has become very rare in places of easy access. So great is the interest taken in this palm that I find it worth while to enumerate the localities where

it was observed by us: Pto Frances, c. 360 m, several trees, c. 500 m, rather common; C. Chifladores, on the ridge; ridge between Q. de la Piedra Agujereada and Q. Laura, 600—650 m, numerous trees; C. Centinela, not uncommon; in the depression between Damajuana and Yunque, c. 600 m, some trees; Q. Damajuana, c. 250 m, rare; slopes of El Yunque; V. Colonial, Q. Gutierrez, c. 300 m, one tree (no. 50); Q. del Monte Maderugo, rare; Q. Seca, 435 m, one tree; northwest slope of Co Pirámide, 600 m, a few trees; on the inaccessible crests round Portezuelo, 600–650 m, many groups; C. Salsipuedes, solitary specimens 600—650 m; Pto Ingles, west quebrada, several groups from 190 m and upwards (fl.-fr. $^{20}/_{1}$ 17, no. 310 ♂, 314 ♀); south side of the island, high cliffs east of Yunque, scattered in the altitude of 7—800 m (fr. March 1917); B. Villagra, Q. de la Choza, 3—400 m, numerous trees.

DRUDE placed *Juania* in the subtribe Iriarteae, but the male flowers, first found by JOHOW, are symmetrical and the stigma almost apical. It comes nearer to Morenieae, but it differs from both in being strictly dioecious. It seems better to make it the type of a separate subtribe.

Area of distribution: Endemic in Masatierra; monotypic.

Bromeliaceae.

Greigia Regel.

29. **G. Berteroi** nov. spec. — Syn. *Tillandsia* spec., BERTERO in Ann. sc. nat. XXI.348.

Truncus lignosus inferne longe repens nec non radicans, dein curvato-adscendens et erectus, ad metrum et ultra longus, circ. 3 cm crassus, vaginis foliorum castaneis dense vestitus, apice rosulam sat magnam foliorum gerens. Folia linearia, membranacea, 75—90 cm longa, basi in vaginam ad 25 mm latam sensim dilatata, supra basin 10—12 mm lata, dein sensim latiora, medio ad 18 mm lata, dein sensim angustata, acutissima, longissime aculeata et apice debiliter pungentia, margine a basi ad $^{3}/_{4}$ long. inermia, versus apicem aculeis unguiformibus minutis circ. $^{1}/_{2}$ mm longis parce munita, supra glaberrima, laete viridi-lactea, subtus argenteo-paleacea. Cetera ignota.

Masatierra: BERTERO! — Gorge above Pangal, c. 660 m, on humid soil in dark *Dicksonia*-forest; one specimen growing on a fallen trunk. According to some of the islanders, the same plant has been observed on the high crest south of Pto Ingles.

After a diligent search in many places, we rediscovered this extremely rare plant in a very remote corner. Unfortunately, none of the few specimens observed were fertile, nor did they show any sign of ever having produced flowers. Possibly the inflorescence is terminal, and the plant attains a great age before it flowers. The stem is simple, or perhaps branched at an early date, the branches becoming separated. The shoot is perhaps monocarpic.

On BERTERO's specimen in Kew is written: »Folia maxime similia *Gregia Pearcei* Mez, vide Bromel. 47», very likely written by MEZ, who quotes the Kew specimen. The vagina is broader in *G. Berteroi,* and it differs from other

species in its caulescent habit; it is of the same morphological type as the rosulate dwarf trees of which there are so many in these islands.

In spite of being unable to give a full description of this peculiar plant, I have thought it better to give it a name: it is certainly not identical with any other, and I do not think it will have to be transferred to another genus, if not to a new one.

Area of distribution: Endemic in Masatierra.

Ochagavia Phil.

30. **O. elegans** Phil. — JOHOW, Estud. 149. — Fig. 5 a.

Masatierra: On rocky ridges from near sea level to the highest crests, not seldom covering the steep cliffs in warm, sunny situations. Pto Frances (JOHOW); El Pangal, on the walls of the canyon, c. 200 m; between Pangal and V. Anson, slope near the sea, c. 50 m (a form with longer leaves); the Damajuana ridge, c. 500 m; between Damajuana and Yunque, 580 m; Co Pirámide, 550—650 m, abundant in places (fl. Dec. 1916, no. 21); V. Colonial, Q. del Monte Maderugo, steep rocks, 390 m; C. Salsipuedes, 465 m, large patch; ridge between Vaquería and Juanango, c. 300 m; Morro Juanango (JOHOW), abundant; north slope of Co Tres Puntas, very abundant (also JOHOW).

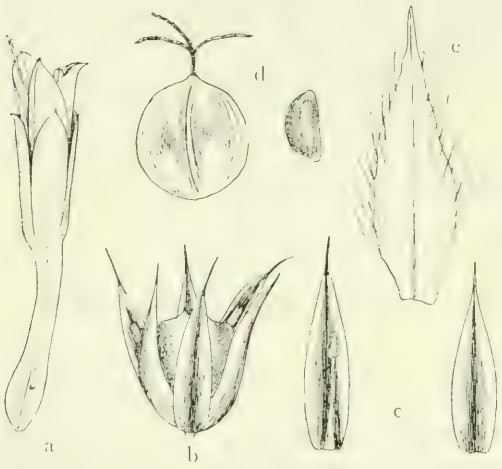


Fig. 5. **a** *Ochagavia elegans*, flower, nat. size. **b—e** *Luzula *insularis*: **b** flower in fruit, **c** outer (with stamen) and inner tepal, **d** capsule and seed, **e** bract, all × 10.

MEZ, DC. Monogr. Phanerog. IX.366, reduced *Ochagavia* to *Rhodostachys*. It is a matter of taste if we follow him or not. *Ochagavia* was described in Bot. Zeitung 1856, *Rhodostachys* in Linnaea 1857; the difference between them is slight, the epigynous tube being more than twice as long in the former, reaching a length of 12—15 mm. The stem is much more elongated, clothed with leaves, the stamens shorter or as long as the petals, which are of a deep violet-crimson. The inflorescence is a short compact spike.

Area of distribution: Endemic in Masatierra; monotypic.

Juncaceae.

Luzula DC.

31. **L. racemosa** Desv. (sp. coll.) subsp. **insularis** nov. subsp. — Syn. *L.* cfr. *alopecurus*, SKOTTSBERG, Stud. 24. — Fig. 5 b—e.

Dense caespitosa, ad 50 cm alta, erecta robusta. Folia ad 15 cm longa,

plana, plerumque 5—8 mm lata, margine dense ac longissime albo villosa, apice acuta subpungentia. Inflorescentia erecta, adulta subnutans, ovoidea—cylindrica, sat compacta, foliis 2—3 sat longis et latis instructa, interdum spicula infima remota et longius pedunculata; spiculae compositae ovoideo-cylindricae vel conicae, bracteis bracteolisque pallidis subhyalinis longe ciliatis. Flores ad 3 mm longi, tepalis integris, externis ovato-lanceolatis, ± convolutis, apice manifeste aristato-acuminatis, 2,8—3 mm longis, castaneis margine pallido, internis 2,5—2,6 mm longis acute acuminatis. Stamina 3 perigonio multo breviora, antherae oblongae 0,4—0,5 mm, filamentis duplo breviores. Stylus brevis, 0,3 mm longus, stigmata longa. Capsula nigro-castanea, trigono-sphaeroidea, apiculata, perigonio multo brevior. Semina minuta oblique fusiformia, ferruginea, basi et apice luteola, 0,8—1 mm longa.

Masafuera: In the alpine region, rare. — The high ridges north of the Casas valley, from 1000 m upwards; more common at Las Torres, 1350—1370 m (fr. $^{14}/_{2}$—$^{20}/_{2}$ 17, no. 408); west wall of the island; C. del Barril, 1290 m.

L. racemosa was established on specimens from the high volcanic peaks of Mexico, collected by HUMBOLDT and by SCHIEDE, see KUNTH Enum. Pl. III.313. *L. vulcanica* Liebm., of which I have seen authentic material (Herb. Upsal.) seems to be the same and was also referred to *L. racemosa* by BUCHENAU. These plants agree very well with the description, so I conclude that the Mexican species is the true *racemosa*. KUNTH did not know this from Perú or Chile, nor was it included in GAY's Bot. VI. BUCHENAU, in Pflanzenreich, Juncac. 75 gave as area of distribution Mexico—Chile, and there are specimens from Fuegia in Herb. Upsal. under the name of *L. racemosa,* determined by him.

The position assigned to the insular form is entirely provisional. I am sure it has little or nothing to do with the Mexican plant, which has very narrow leaves, a slender, almost filiform culm, long ciliated tepals, very short stamens (less than half the length of the perigone) and a light brown capsule with very thin, papyraceous walls. If we had only the Mexican plant to consider, the form from Masafuera would never have been classed as a subspecies of *L. racemosa.* But according to BUCHENAU this is also a Chilean plant, occurring in several forms down to Fuegia, all, however, unlike the Mexican one in habit. Many authors and collectors have followed BUCHENAU in bringing specimens from the southern Andes to *L. racemosa.* In 1908 I collected such forms in West Patagonia and in Skyring Water. *L. *insularis* differs from them as well as from all other forms from the continent, that I have seen, in the broader leaves, the more compact panicle, the longer tepals etc. On the other hand, the forms of Chilean *racemosa* differ from each other in several respects, such as the length of the filaments and size of the anthers, which are twice as large in the form from West Patagonia as in the Skyring plant. Again, one plant collected in Fuegia by DUSÉN (no. 584) and determined by BUCHENAU has the tepals hardly longer than the capsule, thus recalling *L. chilensis.* I have not seen authentic material of the latter species. It differs from *L. racemosa* in possessing 6 stamens, larger anthers (as long as the filaments), and larger seeds (1—2 mm).

It is probable that the Chilean *L. racemosa* differs from the Mexican; it is evident that it includes more than one subspecies or species. When bringing

the island type to this, I have followed BUCHENAU, for it has 3 stamens and a long perigone. I cannot undertake to revise the whole group, for which very extensive material is necessary; I can only express the opinion that, when a revision is made, *L. racemosa* in BUCHENAU's sense will not stand.

Area of distribution: Typical form only in Mexico; other forms (or species?) along the Andes to Fuegia; Masafuera.

Juncus L.

32. **J. imbricatus** Laharpe. — Syn. *J. Chamissonis,* JOHOW, Estud. 151.

Masatierra: V. Colonial (JOHOW), grassy slopes near the sea (fr. $^{11}/_{12}$ 16, no. 108; $^{17}/_{12}$ 16, no. 108 b); B. Villagra; B. Chupones, stony ground (fr. $^{6}/_{1}$ 17, no. 245).

The specimens correspond to var. *Chamissonis* (Kth) Buch., which is hardly separable even as a variety, as ill-defined transitions occur. The flowers show the size of the typical species, as described by BUCHENAU. The habit is variable; no. 108 has culms 15—25 cm high and a dense inflorescence, no. 108 b reaches a hight of 55 cm and has a rather lax inflorescence.

Area of distribution: Ecuador to South Chile; Masatierra; Argentina; Uruguay.

*33. **J. capillaceus** Lam.

Masatierra: East side of V. Colonial, swampy ground near the sea (fl.-fr. $^{29}/_{12}$ 16, no. 201). — Perhaps a recent introduction and not truly indigenous.

Area of distribution: Ecuador; Central Chile; Masatierra; Argentina; Uruguay.

34. **J. acutus** L. — JOHOW, Estud. 150.

Masatierra: SCOULER! — Pto Ingles, central ridge (fl. $^{20}/_{1}$ 17, no. 312; f. laxior, no. 312 b); La Vaquería, open ground (fr. $^{9}/_{4}$ 17, no. 598); stream west of Co Yunque; B. Chupones, on a slope covered with *Rumex acetosella.*

JOHOW believed that this species had been accidentally introduced and that it disappeared from the island soon after, as nobody except SCOULER had seen it. As we have seen, it is distributed over a large part of the island, and nothing enforces us to suppose that it came there with the human traffic.

Area of distribution: West and South Europe; Atlantic Islands; North Africa; the Cape; California; Central Chile; Masatierra; South Brazil; Uruguay; Argentina.

35. **J. Dombeyanus** Gay. — JOHOW, Estud. 151. — Syn. *J. fernandezianus* Steud. Syn. plant. glum. II. 302.

Masatierra: GERMAIN! PHILIPPI! — B. Tierras Amarillas, rare (fl.-fr. $^{5}/_{1}$ 17, no. 242). — Belongs to *α typicus* Buch.

According to JOHOW, *J. microcephalus* Kunth is also found, coll. by SCOULER, DOUGLAS, BERTERO, REED and MOSELEY, but he had only seen REED's specimens, so that I suppose he followed HEMSLEY in bringing all to

microcephalus. HEMSLEY was of the opinion that this hardly differs from *Dombeyanus*. The main difference lies in the size of the head. FUENTES, Revis. Fl. Chil. Junc. 27 speaks of transitional forms between the two among the material from Juan Fernandez. I do not think typical *microcephalus* has been collected in the islands.

Area of distribution: Perú; Chile; Masatierra; Uruguay.

*36. **J. planifolius** R. Br.

Masatierra: V. Colonial, small stream at the foot of the chapel hill (past fl. $^{22}/_{12}$ 16, no. 185).

Probably of recent introduction, perhaps with water-birds occasionally visiting Juan Fernandez; belongs to *genuinus* Buch., a broad-leaved form of this with sheath to 12 and blade to 9 mm wide.

Area of distribution: Australia; Tasmania; New Zealand; South Chile; Masatierra.

Iridaceae.

Libertia Spreng.

37. **L. formosa** Grah. — Syn.: var. *grandiflora* (Phil.), JOHOW, Estud. 150.

Masatierra: barren slopes and rocky ridges, not uncommon. — Co Damajuana, on the north side, c. 500 m; V. Colonial, common from 200 m to Portezuelo (beg. fl. $^{3}/_{12}$ 16, no. 13), more local at a lower altitude; C. Central, c. 570 m; Q. Seca, c. 400 m; C. Salsipuedes, frequent; Villagra; B. Chupones.

Masafuera: on the cliffs near the sea and also in the canyons, common; here and there in the alpine region. — Q. del Pasto; Q. de las Casas; Q. del las Vacas (fr. $^{13}/_{2}$ 17, no. 427); Q. Angosta; Q. del Varadero; Tierras Blancas; Q. de la Lobería (also in the open forest); scattered in the highlands; greatest altitude observed, c. 1400 m.

PHILIPPI argued that his *L. grandiflora* differed from *formosa* in the denser fascicles and the much larger flowers, and in the not cordate or retuse petals. I cannot find any difference between them. The flowers of the island plant are about 22 mm across, the sepals 8 mm long, the petals 16,5 × 14 mm, but smaller in many cases, the filaments 8—8,6 mm, their tube about 2,5 mm long, the anthers 3 mm. In most cases I found the petals distinctly emarginate and with a broad rounded, sometimes subcordate base. Plants grown from seeds, collected in the islands, have smaller flowers than the largest wild ones, but are otherwise quite typical.

L. formosa is very near *L. elegans* Poepp. Cultivated specimens of the latter flowered at the same time in the Gothenburg Garden; the most notable difference lies in the sepals, which are white, almost translucent at the base and crowned by a long, convolute, brown apex, while they are green, more or less pale at the base, obtusate and without acumen in *L. formosa*. The petals are not emarginate in *elegans*, the filaments measure 10 and the anthers 4 mm. The pollen is dark yellow in this, but sulphureous in *formosa*.

Area of distribution: South Chile; Juan Fernandez.

Piperaceae.

Peperomia Ruiz et Pavon.

38. **P. Berteroana** Miq. — JOHOW, Estud. 121.

Masatierra: Moist, shady woods, more numerous in altitudes above 300 m. North slope of Co Damajuana, c. 500 m; V. Colonial, C. Central, c. 500 m; Portezuelo de Villagra (JOHOW), on the rocks near the pass and in the woods on both sides (fl. Dec. 1916, no. 38); Q. del Monte Maderugo, rocks in the forest, 390 m; Q. Salsipuedes, *Dicksonia*-forest, c. 650 m (fl.—fr. $^{8}/_{12}$ 16, no. 96); Pto Ingles (JOHOW), central ridge, c. 380 m (fl.-fr. $^{20}/_{1}$ 17, no. 321); Q. Juanango, at the foot of the high waterfall; mountain ridge west of Co Yunque, c. 500 m (fl. $^{24}/_{4}$ 17, no. 628); Q. Villagra, low hill near the camp, c. 200 m (f. *hirsuta*, no. 261); Q. de la Choza, wet rock in the forest, c. 400 m.

Masafuera: Q. de las Vacas (no. 394, also JOHOW); Q. Angosta, in the gorge by a waterfall; Q. del Varadero; Q. de la Lobería. — Specimens from this island, all found on rock ledges in the canyons, are small and have smaller, less obovate, almost rhomboidal leaves. My material is sterile, and I do not know if the differences are of systematic importance.

Area of distribution: Endemic.

39. **P. margaritifera** Bert. ex Hook. Icon. Plant. I, t. 91. — JOHOW, Estud. 122.

Masatierra: BERTERO! GERMAIN! — El Pangal, in the bottom of the gorge c. 210 m, in wet soil on a rock wall, where water trickles down (fl. $^{1}/_{1}$ 17, no. 220); Q. Juanango, at the foot of the high waterfall, wet soil between stones, c. 225 m (fl. $^{9}/_{4}$ 17, no. 615).

Discovered by BERTERO »en las pendientes sombrías de los cerros mas elevados» and found again by GERMAIN. It probably grows in the foggy region and descends into some of the damp gorges. The specimens from Juanango have pilose leaves, with long stiff hairs spread over the entire lower surface, denser along the midrib; on the upper surface there are a few hairs scattered along the nerves. The margin is lined with hairs except near the base. These plants agree with the type as described and figured by HOOKER. The Pangal specimens are larger with longer spikes and glabrous leaves, the margin often pilose toward the tip. The leaves are conspicuously thinner. This I regard as a form of extreme shade and moisture.

Area of distribution: Endemic in Masatierra.

40. **P. Skottsbergii** C. DC. in SKOTTSBERG, Stud. 20. — Syn. *P. margaritifera*, JOHOW ex p., Estud. 122. — Plate 10.

Masafuera: in the canyon of Q. de las Casas, moist ledges, caves and overhanging rocks, rare (fl. $^{11}/_{2}$ 17, no. 477). Also collected by JOHOW and by the writer in 1908; the only locality known.

Area of distribution: Endemic in Masafuera.

41. **P. fernandeziana** Miq. — JOHOW, Estud. 122.

Masatierra: In the forested region, not uncommon, but not observed at a lower altitude than 400 m. — The ridge between Q. Laura and Q. de la Piedra Agujereada, c. 500 m; small valley above El Pangal, c. 660 m; slopes of Co Damajuana, c. 500 m; Q. Damajuana, 345 m (fl. $^{30}/_{12}$ 16, no. 211); slopes of El Yunque (also JOHOW); V. Colonial, C. Central, c. 400 m, epiphytic; Q. del Monte Maderugo, c. 500 m; northeast side of Co Pirámide, 580 m, on the ground and on trees (fl. $^{15}/_{12}$ 16, no. 140); Portezuelo de Villagra, on both sides; Q. Salsipuedes (also REED), c. 650 m (fl. $^{20}/_{12}$ 16, no. 169); Pto Ingles, on the central ridge, 470 m, epiphytic. An aberrant form with leaves almost intermediate in shape between this and *P. margaritifera* was found below Portezuelo (sterile, no. 1202).

Masafuera: In the forest near Las Chozas; Q. del Mono, in forest, 475 m; Q. de las Casas (JOHOW), under overhanging rocks (fl. $^{11}/_{2}$ 17, no. 418); Q. de las Vacas; Q. del Blindado, rocks in the forest 440 m; C. del Barril c. 750 m, under rocks; east slope of Los Inocentes, 840 m, in fern forest.

Area of distribution: Chile, Frai Jorge and Valdivia; Juan Fernandez.

(Of **P. nummulariaefolia** Griseb. there is a specimen in Herb. Santiago labelled Juan Fernandez, but without locality, date or collector. See JOHOW, Estud. 122. I exclude it from the list.)

Urticaceae.

Urtica L.

42. **U. Masafuerae** Phil. — JOHOW, Estud. 123.

Masafuera: GERMAIN! Oct. 1854, very common in some places according to a communication from the discoverer to JOHOW.

A small annual, very like *U. Berteroana* (= U. echinata Benth. acc. to Index Kewensis), but glabrous except for the calyx and a sparse and coarse indument on the leaves. We did not see a trace of this plant; probably it is a spring herb of short duration.

Area of distribution: Endemic in Masafuera.

43. **U. fernandeziana** (Rich.) Ross; SKOTTSBERG, Stud. 20. — Syn. *U. glomerulaeflora* Steud., JOHOW, Estud. 123.

Masatierra, rare: BERTERO! GERMAIN! — V. Colonial, small quebrada on the west side (SKOTTSBERG 1908); south side of Portezuelo de Villagra, 550 m, two specimens observed near the road (fl.-fr. $^{10}/_{1}$ 17, no. 229).

Masafuera: first found by the writer in 1908. — Q. de las Chozas, *Dicksonia*-grove; Q. del Mono, in the forest, 475 m (fl.-fr. $^{12}/_{2}$ 17, no. 478); near the road to Las Chozas, c. 450 m; Q. del Blindado, in forest, 370 m, 440 m (fl.-fr. $^{19}/_{2}$ 17, no. 1203); Las Torres, fern bed among rocks, 1370 m; C. del Barril, under rocks, 985 m; east slope of Los Inocentes, burnt place in fern thicket, c. 800 m.

Area of distribution: Endemic.

Boehmeria Jacq.

44. **B. excelsa** (Bert. ex Steud.) Wedd. — JOHOW, Estud. 124.

Masatierra: The characteristic tree of the river beds, in groups along the streams in the valleys; forms the westernmost forest patch in the island. — Pto Frances (JOHOW); El Rabanal; El Pangal, common near the entrance (fl. $^{11}/_{12}$ 16, no. 105 ♀, 106 ♂); Q. Damajuana, c. 200 m, scattered trees (fl. $^{6}/_{12}$ 16, no. 58 ♀); Plazoleta del Yunque, not uncommon (also JOHOW); V. Colonial, slopes of C. Central, c. 400 m; Q. Seca, stray specimens, 300 m; Pto Ingles, west branch, fine groups by the stream in the flat part of the valley; Q. Juanango, 215 m; Q. Villagra, some small trees, c. 400 m; Q. de la Choza, solitary trees in dense forest, c. 250 m; foot of Co Chumacera, small pure stand.

Monoecious; generally the branchlets are either ♂ or ♀; male flowers were not observed in female glomerules, but in male ones, which seem to be much rarer, single female flowers occurred.

Unfortunately, I have not found ripe fruits. Habitually, it is very like *B. dealbata* Cheesem. from the Kermadec Islands, as well as other Pacific species, to which *B. excelsa* probably is nearly related. It has also the appearance of *Pipturus albidus* Gray from Hawaii, but as far as can be judged from flowers only it is a true *Boehmeria*.

Area of distribution: Endemic in Masatierra.

Parietaria L.

45. **P. debilis** Forst. — Syn. *P. humifusa*, Rich., JOHOW, Estud. 124.

Masatierra: B. del Padre, stony beach, faded ($^{15}/_{1}$ 17, no. 297).

Masafuera: on the beach between Casas and Mono ($^{18}/_{2}$ 17, no. 1208; JOHOW collected it near this place); Q. de las Casas, walls of the canyon, scarce (fl. $^{6}/_{3}$ 17, no. 368); Q. Angosta, in the gorge by a small waterfall.

Area of distribution: Subcosmopolitan.

Loranthaceae.

Phrygilanthus Eichl.

46. **P. Berteroi** (Hook. et Arn.) Reiche. — Syn. *Loranthus Berteroi* Hook. et Arn., JOHOW, Estud. 126.

Masatierra: BERTERO! BRIDGES! Parasitic, according to the former, on *Myrceugenia*, the commonest forest tree.

We greatly regret having been unable to rediscover this interesting plant. It is certainly very rare. I hardly think that any of the islanders, of which many spend a great deal of their time in the woods, had ever seen this, and only very few had heard of its existence, while all of them were very familiar with other species of the same genus, known as »quintral» on the mainland.

Area of distribution: Endemic in Masatierra.

Santalaceae.

Santalum L.

47. **S. fernandezianum** F. Phil. — JOHOW, Estud. 127.

Masatierra: last seen in Pto Ingles, August 1908, by the writer.

In 1882 D. SEPÚLVEDA rediscovered the sandal wood, long thought extinct, in Pto Ingles, where, according to what he told me, he cut two trees at a low altitude above sea level. Shortly afterwards another person is said to have found one tree near Portezuelo. I do not know who destroyed this. Later (1892?) P. ARREDONDO found another tree in Pto Ingles about 300 m above sea level, and in January or February 1892 he brought JOHOW to the spot. There are specimens in his herbarium from the same tree gathered by SÖHRENS 1895. In August, 1908, ARRENDONDO's son GUILLERMO accompanied me to the locality. From 1892 to 1908 no second specimen had been discovered. I gave an account of this last tree in Svensk Bot. Tidskr., 1910. When we arrived in Masatierra in 1916, we were met by the sad news that the tree had died and become cut up, so that nothing remained. Numerous pieces of the wood were offered for sale.

Masafuera: Pieces of semi-fossil wood have been found in Q. del Sándalo (P. GUTIERREZ, G. ARREDONDO), Q. del Sandalito and Q. del Varadero (GUTIERREZ).

We do not know if the *Santalum* once growing in Masafuera was conspecific with *S. fernandezianum,* for nobody has seen leaves or flowers.

Area of distribution: Endemic. Apparently extinct.

Chenopodiaceae.

Chenopodium L.

48. **Ch. Sanctae Clarae** Joh.; JOHOW, Estud. 119. — Fig. 6 a, 7 a—e.

Santa Clara: Almost confined to a small rock, called Morro del Spartán by JOHOW, M. de los Alelíes by the fishermen from Masatierra, separated from the island by a narrow channel which is nearly dry at low tide (BERTERO; JOHOW, fl. $^{18}/_{6}$ 1895! fr. $^{26}/_{1}$ 17, no. 344).

As JOHOW's description of the flower is very short and as I have discovered two new species of the same insular type, I have found it necessary to add the following observations.

Arborescens, humile. Folia triangulari-ovata vel ovata, apice late rotundata, obtusa—obtusissima, margine irregulariter et grosse sinuato-dentata dentibus rotundato-obtusis; folia ramorum juvenilium majora, lamina 50—90 × 30—60 mm, petiolo 30—45 mm longo. Panicula gynomonoeca; floribus ☿ circ. 1,6 mm diam. tepalis suborbicularibus circ. 1 mm longis, margine late hyalino saepe irregulariter dentato, dorso eximie calloso-costatis, praecipue ad basin pilis vesiculosis vestitis. Stamina maturitate breviter exserta, antheris 0,4 mm longis. Ovarium subglobosum, stylis 2 ad basin perfecte liberis. Flores ♀ minores tepalis 0,6—0,7 mm solum longis (dein paulo auctis); staminodia 5 minuta. Fructus

Fig. 6. Leaves of a *Chenopodium Sanctae Clarae,* b *Ch. Crusoeanum,* c *Ch. nesodendron,* $\frac{1}{2}$ nat. size.

crasse lenticularis, apice subplano-convexus stylis patentibus. Semen horizontale, lenticulare margine obtuso, nitidum, nigro-castaneum, minute punctulato-striatum, 1,2 mm latum et 0,5 mm crassum.

Area of distribution: Endemic in Santa Clara.

*49. **Ch. Crusoeanum** nov. spec. — Fig. 6 b, 7 f—k. Plate 11.

Frutescens, ad 50 cm vel paulo ultra altum, lignosum. Truncus in fissuris rupium absconditus haud accessus, paulo supra basin ramosus, ramis crassioribus ad 9 mm diam.; cortex griseo-viridis vel brunnescens, in ramis junioribus etiam viridis, laevis. Folia versus apicem ramorum subconferta, inferiora mox caduca, longe petiolata, 40—80 mm longa et 20—45 mm lata, petiolo 15—30 mm longo, ovato-triangularia, basi subtruncata vel late rhomboidea, apice rotundata—rotundato-acuminata, sat obtusa, subintegra vel praecipue basin versus irregulariter dentata usque serrata denticulis brevibus acutis, supra viridia, subtus glaucescentia pilis vesiculosis dense vestita; textura tenuis; nervi flavescentes subtus prominuli. Inflorescentia gynomonoeca paniculata, in ramis terminalis, aphylla, pyramidata, valde laxa ramis patentibus; flores subsolitarii; bracteae minutae. Flores ☿ 1,5—1,7 mm diam., tepalis late ovatis 1—1,2 mm longis cucullatis basi concretis, vesiculoso-pilosis, valde viridi-callosis, margine hyalino sat irregulari. Stamina primo inclusa dein breviter exserta, filamentis tepalis paulo longioribus vel aequilongis, thecis ovoideis 0,7—0,8 mm longis. Ovarium ovoideo-subglobosum vel ovoideo-conicum, 0,6 mm altum, apice subiter contractum stylobasin formans; styli 2 liberi erecto-patentes, e basi incrassata filiformes. Flores ♀ tepalis aliquantum minoribus haud 1 mm longis (dein auctis), staminodiis 5 minutis. Fructus lenticularis, 1,5—1,6 mm diam., stylopodio distincto stylisque erectis, pericarpio opaco punctulato. Semen fere ut in praecedente.

Masatierra: on a rather inaccessible mountain wall in the bottom of the Pangal gorge, in fissures c. 220 m, rare (fl.-fr. 1/1 17, no. 227).

Differs from *Ch. Sanctae Clarae* in the more slender habit, the shape of the leaves and fruit etc., as seen from my description and figures.

Area of distribution: Endemic in Masatierra.

*50. **Ch. nesodendron** nov. sp. — Fig. 6 c, 7 l—o.

Arbor vera quamquam pumila, ad 2,8 m alta visa; truncus primarius crassus, paulo supra basin ad 12 cm diam., usque ad apicem ± distinctus, tota longitudine ramis vestitus, inferioribus mortuis; cortex viridis — viridi-stramineus. Folia versus apicem ramorum conferta, inferiora mox caduca, triangularia, basi truncata vel angustata, breviter decurrentia, ± longe et saepe permanifeste acuminata, acuta, margine ± profunde, grosse et irregulariter dentato-serrata sed versus apicem saepius subintegra, dentibus acutis triangularibus, majoribus interdum denticulis 1—2 instructis; lamina supra viridi-flavescens, subtus viridi-glauca vesiculoso-pilosa nervis pallidis prominulis; textura sat tenuis; lamina in ramis florigeris (num. 550) circ. 30—40 × 20—25 mm, petiolo 15—50 mm longo, in innovationibus (num. 523) majuscula, ad 80—95 mm longa et 45—65 mm lata, petiolo 34—45 mm longo. Panicula in ramis terminalis, pyramidata, 4—6 cm alta, sat densa, gynomonoeca. Flores ☿ 1,3—1,5 mm diam., tepalis ovato-lanceolatis obtusis valde cucullatis dorso crasse callosis margine late hyalinis ± denticulato-ciliatis. Stamina perigonio paulo longiora breviter exserta. Ovarium ovoideo-conicum 1,5 mm altum in rostrum longum productum; styli 2 basi subincrassati valde patentes liberi. Flores ♀ tepalis minoribus, staminodiis 5 minutis. Fructus longe rostratus, 2—2,5 mm longus, 1,5 mm diam., rostro 1—1,4 mm

Fig. 7. a–e *Chenopodium Sanctae Clarae:* a ☿ fl., (pistil removed), and one tepal, b ♀ fl. and one tepal, c ♀ fl. showing staminodes, d pistil, e fruit. f–k *Ch. Crusoeanum:* f ☿ fl. and one tepal, g ♀ fl., h ♀ fl. showing staminodes, i pistil, k fruit and tepal. l–o *Ch. nesodendron:* l ☿ fl. and one tepal, m ♀ fl. showing staminodes, n pistil, o fruits. — d, i, n, × 30, all others × 15.

longo, pericarpio tenui opaco punctulato. Semen fere ut in praecedentibus, horizontale vel leviter obliquum, circ. 1,3 mm diam. et 0,7 mm crassum.

Masafuera: Slope near Las Chozas, c. 500 m (fr. $^3/_3$ 17, no. 550); lower slopes of Los Inocentes, in the grass and fern beds, c. 500 m; Q. de la Lobería,

one large specimen in the gorge among rocks (no. 523). The species is everywhere persecuted by the indefatigable goats.

Differs from the other species in the much greater size, the shape of the leaves and fruit, etc. Seeds from no. 550 were sown in the Gothenburg Garden in 1918, the plants are quite typical, but have not yet produced flowers. Their habit is truly arborescent.

Area of distribution: Endemic in Masafuera.

The three Juan Fernandez species of *Chenopodium,* each confined to a single island, are related to *Ch. paniculatum* Hook. from North America, Perú and Chile, ranging from 49° N. to 32° S. This is a polymorphic species that was treated by J. MURR in Oesterr. Bot. Zeitschr., it is herbaceous or »halbstrauchartig» and the leaves mostly entire. The island species are probably also related to *Ch. sandwicheum* Moq. from Hawaii.

Salicornia L.

51. **S. peruviana** Kunth. — JOHOW, Estud. 120.

Masatierra: here and there along the east and north sides of the island, forming patches above the highwater line (fl. $^{15}/_{1}$ 17, no. 299).

Santa Clara (also observed by JOHOW).

Masafuera: GERMAIN; near entrance to Q. del Varadero and Q. Angosta; Playa Ancha; Tierras Blancas (no. 433); Lobería Vieja (JOHOW).

Area of distribution: West coast of South America; Juan Fernandez.

Aizoaceae.

Tetragonia L.

52. **T. expansa** Murr. — JOHOW, Estud. 116.

Stony beaches, rather uncommon.

Masatierra: Pta San Carlos, scattered (fl.-fr. $^{12}/_{12}$ 16, no. 126, also observed by JOHOW); B. del Padre (JOHOW).

Santa Clara: Morro de los Alelíes (unr. fr. $^{26}/_{1}$ 17, no. 347; also observed by JOHOW).

***Masafuera:** between Casas and Vacas (fl.-unr. fr. $^{13}/_{2}$ 17, no. 512); Playa Ancha (fr. $^{22}/_{2}$ 17, no. 1206). — New for this island.

Area of distribution: Coasts and islands of the Pacific.

Caryophyllaceae.

Spergularia Presl.

53. **S. confertiflora** Steud. Flora 1856,425. — *S. rubra,* JOHOW, Estud. 118.

STEUDEL based his species (erroneously called confertifolia by JOHOW) on BERTERO no. 1431 from Masatierra: »floribus versus apicem ramorum axillaribus

et terminalibus non paniculatis sed ob folia magis approximata confertioribus», thus a form with a contracted, leafy inflorescence. But BERTERO's material includes, under the same number (Herb. Kew!) another form with long, rather lax, terminal cymes, and there are numerous transitions between these two types. A similar form was described by PHILIPPI as *Arenaria rubra* var. *polyphylla* (Masafuera, GERMAIN!). ROHRBACH, Linnaea XXXVII.232 considered this to be a good species and called it *Spergularia polyphylla* (Phil.) Rohrb.: »hab. in insulis Juan Fernandez et Masafuera (PHILIPPI)», but the specimens from Masafuera were certainly not collected by PHILIPPI, who never visited this island, so the statement probably refers to GERMAIN's plant. In Herb. Santiago are specimens collected in Masatierra by PHILIPPI (1861) and by REED (1872), but I do not know which of these were considered by ROHRBACH to belong to *S. polyphylla.* The species was characterized by the structure of the seed test, the papillae were described as one-sided, flattened, often slightly curved. REICHE, Flora I. 197 retained this as *Tissa polyphylla* (»Syn. S. confertiflora Steud.»), but quoted plants from Masafuera only.

Another species to be considered here is *S. remotiflora* Steud. l. c. 424 from Chile. According to the description this must be exactly like the lax form of *confertiflora.* REICHE, however, brought it to *Tissa media,* without having seen the type. As I have no means to revise the whole genus, I have retained the island species as *S. confertiflora.* This is a correct name, given to a Juan Fernandez plant collected by BERTERO; I have seen the type material and my plants as well as those collected by PHILIPPI, JOHOW etc. belong to the same species. HEMSLEY and JOHOW were of the opinion that all the forms found on Juan Fernandez were varieties of *S. rubra* Presl (S. campestris [L.] Aschers.), which has become introduced into South America. But *S. confertiflora* is a perennial, stout, lignified, almost shrubby species; in the axils are dense glomerules of small leaves, giving to the stem the appearance of being clothed with leaves; the stipules of two opposite leaves are entirely united into one interpetiolar stipule on each side; the pedicels are never reflexed. I find it impossible to regard the island species as only a form of *S. campestris,* but believe that it is indigenous in Central Chile.

Habitually, *S. confertiflora* varies a great deal. It is contracted or lax, nearly glabrous or glandulose, the leaves long and narrow or short and broad, the petals white or rosa. Undoubtedly it includes an aggregation of forms, that ought to be cultivated in order to get an idea of their systematic value. Two will be listed here under separate names, var. *polyphylla* in the sense of ROHRBACH, with oblique seed papillae, and var. *glaberrima,* a perfectly glabrous, yellowish green form from Masafuera. I have sown seeds of one form from Masatierra, and of *polyphylla* and *glaberrima* from Masafuera. The plants are young and have not flowered (August, 1921); they are perfectly distinguishable from each other.

KINDBERG, in his monograph, does not mention *S. confertiflora* or *polyphylla,* and REICHE does not quote the monograph, where several Chilean species were described and figured.

Masatierra: lava beds of the sea coast, one of the very few plants thriving on the dry, barren cliffs. Pta San Carlos (fl.-fr. $^{12}/_{12}$ 16, $^{9}/_{1}$ 17, no. 123; also

observed by JOHOW); Pto Ingles; Tres Puntas (JOHOW); B. del Padre (fl.-fr. $^{15}/_{1}$ 17, no. 296); Co Negro (fl.-fr. $^{7}/_{1}$ 17, nos. 262, 266); Pta Larga; Tierras Blancas (fl. $^{6}/_{8}$ 17, BÄCKSTRÖM no. 1208).

Santa Clara, also observed by JOHOW; Morro de los Alelíes (fl. $^{26}/_{1}$ 17, no. 349).

var. **polyphylla** (Phil.) Skottsb.

Masatierra: PHILIPPI! REED!

Masafuera: GERMAIN! — Scattered along the coast from B. Toltén (fr. $^{2}/_{2}$ 17, no. 470) to Playa Ancha; common at the Casas entrance (fl.-fr. $^{16}/_{2}$ 17, no. 387); Q. del Varadero (fl. $^{12}/_{3}$ 17, no. 569). — Variable in habit, but generally densely pubescent.

var. **glaberrima** nov. var. — Humilis, luteoviridis tota glaberrima, folia carnosa sat lata, mucronata, subpungentia, stipulis interpetiolaribus late triangulatis apice ± laceratis; inflorescentia compacta foliosa; petala alba; capsula interdum sepalis paulo longior; semina parce tuberculata—sublaevia.

Masafuera: entrance to the Casas Valley (fl.-fr. $^{10}/_{2}$ 17, no. 411).

Area of distribution of *S. confertiflora:* Central Chile; Juan Fernandez.

Paronychia L.

54. **P. chilensis** DC. — JOHOW, Estud. 118.

Masatierra: barren slopes in the west part of V. Colonial, rare (fr. Dec. 1916, no. 15); the treeless western slopes of the island (SÖHRENS).

Remarkably enough this plant escaped the attention of all earlier visitors except one; still, it may not be of recent introduction.

Area of distribution: Chile, Coquimbo to Valdivia; Masatierra.

*Ranunculaceae.

Ranunculus L.

*55. **R. caprarum** nov. spec. — Fig. 8.

Erectus, villosus, ad 0,75 m altus. Rhizoma sat breve, crassum, ramosum. Folia basalia latissime vaginantia, longissime petiolata; lamina crasse chartacea, obscure viridis, supra adpresse pilosa, subtus praecipue secus nervos longius sericeo-villosa, nervis reticulato-palmatis subtus versus basin valde incrassatis, ambitu cordato- vel reniformi-orbicularis, subpeltata, fere ad basin tripartita; lacinia centralis late cuneato-oblonga vel suborbicularis, ± distincte lateque petiolulata, ima basi cuneata, ad $^{1}/_{4}$—$^{1}/_{3}$ trilobata, lobis ± profunde lobulatis, lobulis dentato-serratis; laciniae laterales rectangulato-semiorbiculares, subsessiles, basi late cuneatae et integrae, ceterum inciso-lobatae, lobulatae nec non dentatae; petiolus costato-striatus, patente, longe nec non sat dense villosus, crassus; vagina subglabra vel extus ± adpresse pilosa. Folia majora visa petiolo (cum vagina) 29—46 cm longo et circ. 5 mm crasso; vagina circ. 6—9 cm

longa basi 3,5—4 cm lata; lamina 14—19 cm longa et 17—23 cm lata. Caulis sulcato-striatus, inferne villosus, superne minus hirsutus, repetiter ramosus. Folia caulina inferiora pauca, basalibus ± similia, sessilia sed longe vaginantia, profundius divisa; summa ornithopodioidea, brevissime vaginantia, profunde tripartita, lobis subintegris. Flores sat numerosi, inflorescentiam subracemosam sat expansam laxam foliosam formantes, pedunculo usque ad 5—6 cm longo, sub flore densius villoso suffulti. Sepala .... Petala .... Stamina .... Receptaculum ovoideo-

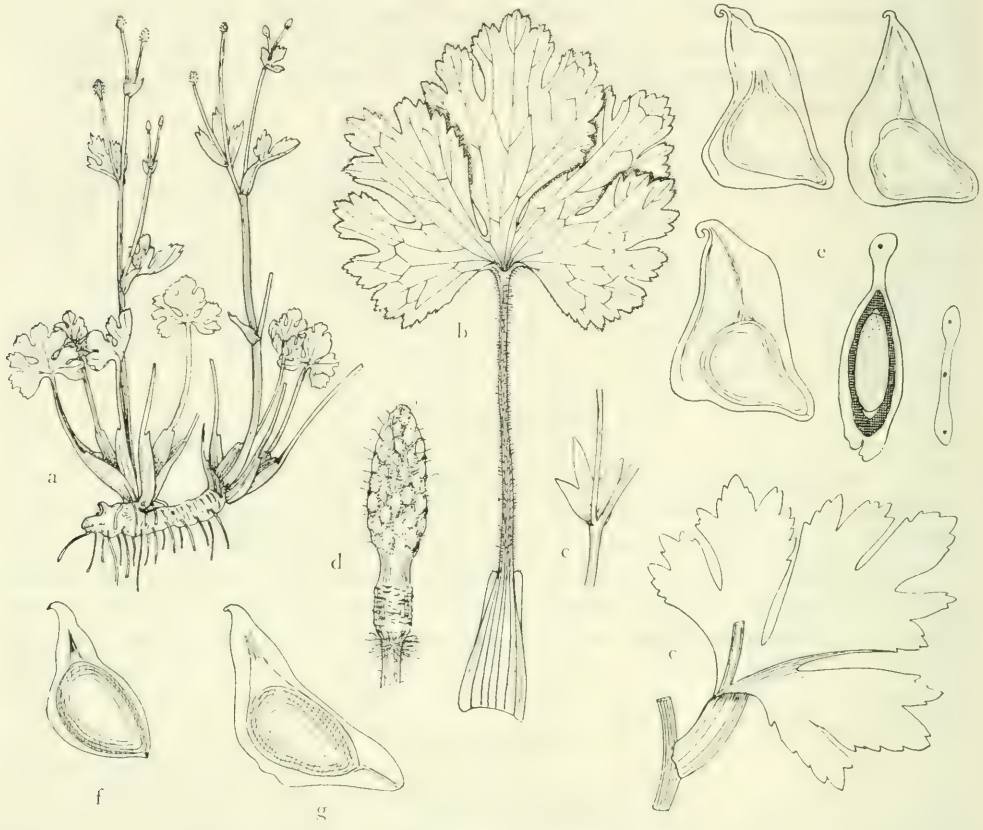


Fig. 8. a—e *Ranunculus caprarum:* a plant after a rough sketch from nature, much reduced; b basal leaf, c cauline leaves, ½ nat. size; d receptacle, × 4; e three carpels, × 4, and cross sections through carpel, × 6. f carpel of *R. hawaiensis,* g of *R. Haastii,* × 4.

conicum, 4—6 mm longum, parce pilosum. Achaenia triangularia, valde compressa, 6—7 mm longa et 3—4 mm lata, glabra; nux cuneato-lenticularis, versus apicem late alato-marginata; ala in stylum apice filiformi-recurvum stigmatiferum attenuata.

Masafuera: near the goat track along the western precipice, north of the Casas gorge, c. 1200—1300 m, rare (ripe fr. $^{5-7}/_{3}$ 17, no. 366).

I deeply regret having to describe this on incomplete material. The anatomical structure of the achene shows that it belongs to *Ranunculus,* and there is no doubt that it is a new species. All the plants found were in fruit, but most of them had not even the receptacles left, as the flower stalks had

been bitten off by the goats; in fact, not one intact specimen was seen and most of them were badly damaged, so that the existence of the species seems to be seriously threatened. As far as I can find, *R. caprarum* has no relative in America. Habitually, it belongs to the type of *R. Lyallii* Hook. fil., *insignis* Hook. fil. and *nivicola* Hook., all from New Zealand; it is remarkably like the last mentioned, which differs in the less deeply cleft basal leaves and in the unwinged achenes. But in another New Zealand species, *R. Haastii* Hook. fil. (Fig. 8 g), which has a different habit, we find the same flat, winged achenes. It is possible that *R. hawaiensis* A. Gray (Fig. 8 f) and R. *mauiensis* A. Gray from Hawaii belong to the same group; their leaves are more divided with stalked segments and the nut is barely winged, but there is a distinct trace of a wing on the style. I regard *R. caprarum* as another addition to the old Pacific element in the flora.

Area of distribution: Endemic in Masafuera.

Berberidaceae.

Berberis L.

56. **B. corymbosa** Hook. et Arn. — JOHOW, Estud. 115. — Fig. 9 c—d.

Masatierra: not uncommon along the high ridges but never occurring in considerable number nor forming thickets; sometimes also found in the open forest. — Co Centinela, c. 400 m; El Pangal, near the entrance and on the walls of the gorge, c. 200 m; Q. Damajuana, open forest on steep slope, 345 m; in the gap between Damajuana and Yunque, 550—600 m (unr. fr. $^{18}/_{12}$ 16, no. 158); high peak between Pangal and V. Colonial, 365 m; V. Colonial, C. Central, 570 m (also observed by JOHOW); Portezuelo de Villagra, a few small shrubs near the SELKIRK tablet, c. 600 m (fl. $^{3}/_{12}$ 16, no. 36); Q. del Monte Maderugo, steep rocks; Q. Seca, open forest, c. 500 m; C. Salsipuedes (also observed by JOHOW), 400—600 m, in brushwood and forest, on the ridge and on both slopes; Pto Ingles, central ridge, 470 m; Q. Vaqueria, in open forest, c. 250 m; mountain spur W of El Yunque, in forest, 530 m; Q. Villagra, higher parts, scattered.

B. paniculata Phil. was retained as a species by HEMSLEY but reduced to *B. corymbosa* by REICHE and JOHOW. After having examined the type in Herb. Santiago I can only subscribe to the opinion of the latter. From the description of PHILIPPI (narrow leaves!) one would perhaps conclude that *B. paniculata* is the same form that I have described below from Masafuera. This is not the case; the leaves vary in *B. corymbosa*, but *B. paniculata* falls within the limits if this. Bracts in the panicle are found in otherwise typical *corymbosa*.

Area of distribution: Endemic in Masatierra.

*57. **B. masafuerana** nov. spec. — Fig. 9 a—b.

Frutex metralis et ultra, ramis tenuibus cortice obscure rubro—atro-violaceo, leviter sulcato in junioribus saltem lucido sicut vernicoso, ramellis distantibus.

Folia primaria plantulae juvenilis suborbicularia, grosse et irregulariter sinuata, interdum dentibus nonnullis pungentibus munita, lamina ad 2 cm longa et lata, petiolo circ. 2 cm longo apice vel paulo infra distincte articulato. Spinae sat mites, nondum pungentes, plerumque simplices, rarissime segmentis 1—2 lateralibus munitae, 3—5 mm longae. Ramelli foliigeri brevissimi, distantes. Folia secundaria anguste obovato-elliptica—elliptico-lanceolata, coriacea, discoloria subtus pallida, obtusa, basi manifeste angustata, reticulato-nervosa; lamina 2—3,5 cm longa et 0,6—1,3 cm lata; petiolus tenuis vulgo 2—3, rarius ad 6 mm longus, paulo supra basin articulatus. Cetera ignota.

Fig. 9. a—b *Berberis masafuerana:* a part of branch and one small leaf, b largest leaves seen. c—d *B. corymbosa:* c ordinary leaves, d exceptionally narrow leaves. All natural size.

Masafuera: Q. de las Casas, one seedling by the side of a waterfall, 215 m; larger shrubs seen on the wall of the canyon in an utterly inaccessible place, but some branches were obtained by means of a lasso (no. 503); Q. de la Lobería, one shrub on a steep rock in the stream.

Unfortunately, all specimens observed were sterile. *B. masafuerana* comes very near *B. corymbosa,* but differs in the colour of the cortex, in the much narrower and more coriaceous leaves and in the slender habit. I have never seen anything like this form in Masatierra, so I am confident that the flower and fruit will offer structural differences.

Area of distribution: Endemic in Masafuera.

Magnoliaceae.

Drimys Forst.

58. **D. Winteri** Forst. var. *confertifolia* (Phil.) Joh.; JOHOW, Estud. 113.

Masatierra: One of the commonest forest trees, ranging from 200 or 300 m to the highest ridges and forming the edge of the forest in wind-swept places, where few other trees thrive. In the foggy region very old and large trees were observed, with a thickness at the base hardly reached by any other tree in the islands. *Drimys* inhabits the whole forested belt of Masatierra from Pto Frances to Co Chumacera. Coll. fl. $^{3}/_{12}$ 16, no. 6, $^{8}/_{12}$ 16, no. 88, fr. $^{21}/_{4}$ 17, no. 88 b.

Masafuera: in the higher parts of the montane region, generally forming the limit of the forest; not seen at a much lower altitude than 500 m; Pasto, Chozas and Mono valleys, 475—1100 m; one tree at the Correspondencia Camp, 1130 m; ravine north of this place, c. 1200 m, greatest altitude observed; on the western precipice, solitary trees above Buque Varado; C. del Barril, to 1110 m (fr. $^{1}/_{3}$ 17, no. 371); east slope of Los Inocentes, 740—1000 m.

The oldest name for the island *Drimys* seems to be *D. confertifolia* Phil. Anal. Univ. Chile 1856 (May), 163; in July the same year STEUDEL published his *D. fernandeziana*. REICHE, Flora I. 27, used the combination *D. Winteri* var. *fernandeziana* Steud., for he quoted Bot. Zeit. 1856 (Sept.!) for *D. confertifolia* Phil. STEUDEL did not, however, describe it as a variety, but as a species, and thus we may use the name *confertifolia* (Phil.) Johow. According to STEUDEL the island form differs from continental ones in the narrower leaves, which are blunt or hardly acute, rufescent above, pale below and more aggregated, and in the dioecious flowers. PHILIPPI advanced that the leaves are densely aggregated, smaller, less whitish below and much shorter petiolate. MIERS, Ann. and Mag. Nat. Hist. 1858, 48, described it as *D. fernandezianus* Miers (without quoting other authors); the description was reprinted and an unsatisfactory figure added in Contr. to Botany I (1861) 137, Pl. 27 B. The differences between MIERS' species and *D. chilensis* DC. are not at all better defined by him than by other authors. JOHOW, who regards *D. confertifolia* as a variety, stated that it differs in the smaller and more densely clustered leaves, and says that the trees in Masafuera have more polished leaves than those from the other island. REICHE l. c. 27 described the leaves as »angostamente oblongas, casi lineares, muy cortamente pecioladas».

I shall not enter upon the question whether the continental forms all belong to one species or not; but I cannot separate *D. chilensis* DC. or *paniculata* Steud. from *D. Winteri,* and I cannot regard the Juan Fernandez plant as specifically distinct. It is true that many of the herbarium specimens studied by STEUDEL, MIERS, etc. have the leaves of the flowering branches comparatively small and narrow, but if we study the living plant, we shall find that there is a considerable variation in the size of the leaves, which often attain 12—13 × 3—4 cm, quite normal figures in continental forms. I need not tell that the rufescent upper surface of the leaves spoken of by STEUDEL is due to desicca-

tion. The colour of the lower surface shows the same considerable variation as in other forms. The flowers are not dioecious, but bisexual and quite typical, and do not differ in size or shape from Chilean specimens. The only character remaining is the clustered leaves, but even in this case there is a considerable variation between different trees and also between different branches of the same tree. Generally, the short internodes give to the island *Drimys* a somewhat different habit, but cultivation alone will decide upon the value of this character. A distinct tendency to the development of a form with shorter internodes was observed in the introduced *Aristotelia maqui,* both by JOHOW (l. c. 108) and by the writer.

Area of distribution: Not counting the tropical forms, *D. Winteri* inhabits Chile from Frai Jorge (an isolated locality) to Cape Horn, and Juan Fernandez.

Lactoridaceae.

Lactoris Phil.

59. **L. fernandeziana** Phil. — JOHOW, Estud. 114. — Plate 12, fig. 1.

Masatierra: in the damp montane region, confined to the dense and humid forests above 500 m, rare. — C. Chifladores, steep slope above Pto Frances, c. 500 m, about a dozen plants (past fl. $^{17}/_{4}$ 17, no. 622); forests of El Yunque (JOHOW); V. Colonial, C. Central, one plant 510 m, several 520 m (fl. $^{18}/_{1}$ 17, no. 303); Portezuelo de Villagra (also observed by JOHOW), one small specimen, 570 m; mountains at the back of Pto Ingles (JOHOW); mountain ridge west of El Yunque, c. 500 m, very rare (fr. $^{24}/_{4}$ 17, no. 629); highest part of the Villagra Valley below Portezuelo, some fine shrubs at the roadside, 510 m (fl. $^{8}/_{1}$ 17, no. 230).

Area of distribution: Endemic in Masatierra.

Cruciferae.

Cardamine L.

60. **C. chenopodiifolia** Pers. — Syn. *C. fernandeziana* (Phil.) Joh.; JOHOW, Estud. 110.

Masatierra: GERMAIN; REED!

Unfortunately, no trace was seen of this interesting plant. GERMAIN collected it in October, 1854, REED in September, 1872; it is an annual, developed in the spring and probably of short duration, and this explains that we did not find it. Perhaps it did not appear at all in 1916 on account of the very dry spring. It is also possible that it has become very rare or that it has disappeared altogether. As it is unknown in Perú and Chile, we have no good reason to regard it as accidentally introduced.

I am convinced that SCHULZ (ENGLER's Jahrb. XXXII. 443) was right in bringing *Heterocarpus fernandezianus* Phil. to *Cardamine chenopodiifolia;* when comparing the former with material of the latter from Uruguay, Brazil and Bolivia, I came

to the same conclusion. Certainly, the distribution is quite puzzling and different from that of all other species indigenous in the islands, which led me to the conclusion (Stud. 19) that it had become introduced with the human traffic.

Area of distribution: Bolivia, Brazil, Argentina, Uruguay.

61. **C. flaccida** Cham. et Schlecht. — Syn. *C. alsophila* Phil., JOHOW, Estud. 111.

Masatierra: streams and other wet places, local. Pto Frances (JOHOW); El Pangal, moss mats in the stream near the entrance; wet moss cushions by the waterfall, 215 m (f. *pilosa* O. E. Sch., fl.-fr. $^{1}/_{1}$ 17, no. 219 — »nonnulla specimina interdum ad subspeciem *alsophila* spectant», scr. O. E. SCHULZ in sched.); Q. Damajuana, moss mats at a small waterfall, 250 m, common (prol. *depressa* O. E. Sch., fl. $^{6}/_{12}$ 16, no. 57); Q. Juanango, by the stream (f. *pilosa,* fl.-fr. $^{9}/_{4}$ 17, no. 603); south side of Portezuelo (JOHOW); Co Chumacera, shady corner in wet soil at the small waterfall in the *Boehmeria*-forest (f. *integra* O. E. Sch., fl.-fr. $^{6}/_{1}$ 17, no. 251).

Area of distribution: Widely dispersed in the warm and temperate parts of South America, in Chile in the southern provinces. Prol. *depressa* was collected near Talcahuano, var. *pilosa* near Valparaiso and in Masatierra, f. *integra* in »Chile» (leg. BERTERO). What SCHULZ calls typical *alsophila* has not been reported from Juan Fernandez.

62. **C. Krüsselii** Joh., JOHOW, Estud. 112.

Masafuera: Forest northwest of Q. de las Casas (JOHOW!); Q. de la Lobería, by the stream (fr. $^{17}/_{2}$ 17, no. 479).

We made a diligent search for this species in all the forest patches northwest of the Casas Valley, but without result. The plants collected in the new locality differ from the type in being almost glabrous, and were distinguished by O. E. SCHULZ as f. *glabrescens*. According to the same authority, *C. Krüsselii* is related to the chilean *C. vulgaris* Phil.

Area of distribution: Endemic in Masafuera.

Saxifragaceae.

Escallonia Mutis.

63. **E. Callcottiae** Hook. et Arn. — Syn. *E. fernandezia* Phil. — JOHOW, Estud. 100.

Masatierra: One of the commoner plants, rather abundant on all the ridges from Pto Frances to Q. Juanango, but also found on the lower barren slopes down to the sea level. Scattered on the south side from Villagra to Pta Larga. Fl. Dec.—April (nos. 2, 95, 257), fr. in April.

Very variable in size, a small tree or, on dry stony ground, a trailing shrub. Leaves small or large, flowers generally paniculate, but sometimes racemose, colour of corolla a more or less deep rosa to crimson.

Area of distribution: Endemic in Masatierra.

Rosaceae.

Rubus L.

64. **R. geoides** Sm. — SKOTTSBERG, Stud. 10.

Masafuera: Not uncommon in the alpine region, but not observed at a lower altitude than 1000 m. Highland north of Casas, 1130—1370 m (fr. Feb. 1917, no. 404); C. del Barril, 1290 m (no. 538); Los Inocentes, from 1375 m to the top; ridge between Q. Inocentes and Q. Angosta, c. 1000 m. — Discovered by the writer in 1908.

Area of distribution: Patagonian Andes (two localities; one far north, 38°, needing confirmation); West Patagonia; Fuegia; Falkland Islands; Masafuera.

Margyricarpus Ruiz et Pav.

65. **M. setosus** Ruiz et Pav. subsp. **digynus** Bitter, SKOTTSBERG, Stud. 9. - JOHOW, Estud. 91.

Masatierra: on the low, dry slopes below the forest region, also in the western half of the island and on the high ridges above the forest. — Between Pto Frances and V. Colonial, on the slopes of the valleys and on the ridges, common on the slopes of El Centinela (also observed by JOHOW); V. Colonial, not uncommon (also observed by JOHOW); C. Salsipuedes, ascending to 500 m (fl.-unr. fr. $^{8}/_{12}$ 16, no. 71); La Vaquería, dry slopes; between Villagra and Pta Larga, scattered in the steppe-like vegetation (fl.-unr. fr. $^{7}/_{1}$ 17, no. 233).

Area of distribution: Perú; Central and South Chile; Argentina (Prov. Buenos Aires); Patagonia. The subsp. *digynus* endemic in Masatierra.

Acaena L.

66. **A. masafuerana** Bitter Bibl. Bot. 74 (1911) 45. — Fig. 10.

Masafuera: Scattered in the fell-fields, forming small dense mats together with mosses and lichens. Between the Correspondencia Camp and Las Torres, 1130—1370 m (fl.-fr. $^{14}/_{2}$ 17, no. 395); edge of west precipice above Buque Varado, c. 1230 m; C. del Barril, 1110—1360 m (fr. $^{1}/_{3}$ 17, no. 539); Los Inocentes, from 1125 m to near the summit (fr. $^{9}/_{3}$ 17, no. 380).

Sterile specimens were brought by the writer in 1908 and described by Professor BITTER. The new material was again studied by him, and he gives the following account of it.

»Procumbens vel parum ascendens, caespitosa, caudex cr. 2—4 mm crassus, in radicem sat longam ramosam exiens, in ramos complures ± ve divaricantes partitus; rami inter muscos et gramina repentes, breves, ± ve congesti vel longiores cr. 4—11 cm longi, infra vaginis fuscescentibus subnitidis foliorum emortuorum densiusculis obtecti, apice foliis adhuc vigentibus subrosulantibus instructi; folia parva, cr. 1,2—4 cm longa; vaginae rufo-fuscescentes, nitidae,

usque ad 10 : 3 mm, utrinque glabrae (etiam in margine); stipulae frondosae, lanceolatae, acutae, simplices vel vix dentatae, rarius manifeste 1-dentatae, cr. 1—2 : 0,5—1 mm, glabrae vel prope apicem pilis parvis tenuibus marginalibus nonnullis instructae; petiolus plerumque brevissimus, cr. 2—3 mm, rarius ad 8 mm longus, glaber; costa mediana subtus glabra vel parce pilosa; lamina 6—24 : 4—12 mm, plerumque 7 (rarius 9)-foliolata; foliola obovata, obtusa (inferiora nonnumquam acutiuscula), plana vel margine paulum revoluta, crenati-dentata, supra sordide viridia, fere glabra, ad dentium apices versus tantum in venis ordinis

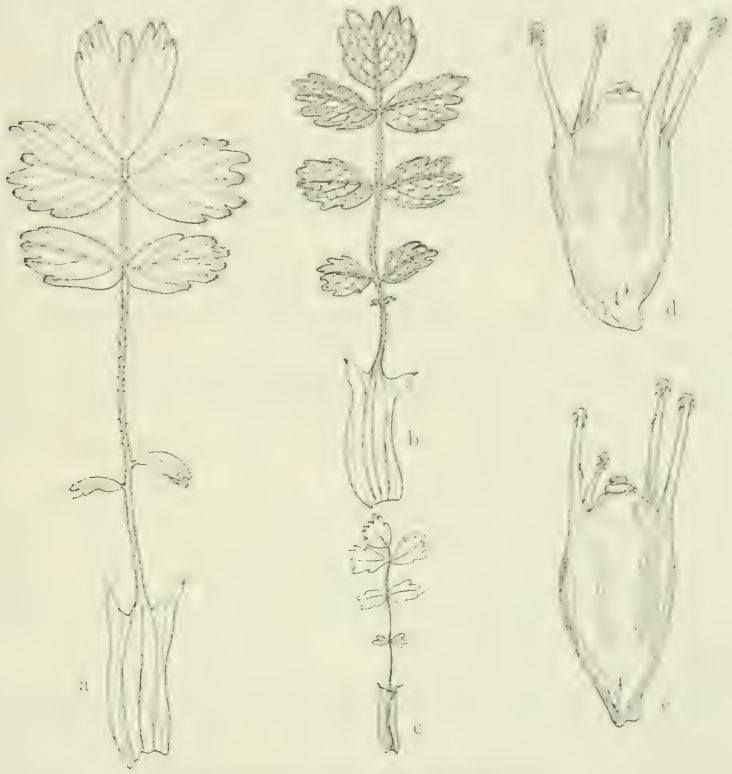


Fig. 10. *Acaena masafuerana:* leaves, **a** upper side, × 3, **b** lower side × 3, **c** nat. size; **d**, **e** achenes, × 18.

secundi manifeste albide pilosa, subtus paulum glaucescentia, in venis primariis secundariisque dense pilosa vel solum in vena media appresse sericeo-pilosa, dentes margine et apice dense breviter pilosi; stipulae et foliolorum dentes in pagina superiore in hydathodam rubescentem exeuntes; paris supremi foliola sessilia, 2,5 : 1,2 usque ad 7 : 4 mm, 5—8 dentata; foliolum terminale breviter petiolulatum (cr. 0,5—1,5, rarius — 3 mm), cr. 2 : 2 usque ad 6 : 5 mm, 5—9-dentatum, dens apicalis lateralibus manifeste minor, quam ob rem foliolum terminale lateralibus obtusius; scapus in parte inferiore foliis 1—2 approximatis reductis instructus, ceterum nudus, vel rarius fere medio vel paulum infra capitulum folio valde reducto praeditus, in statu fructifero 6,5—11,5 cm longus, gracilis, in parte basilari ascendens, ceterum rectus, viridis vel purpurei-suffusus.

glaber; capitulum terminale parvum, cr. 3—(tandem) 5 mm diam.; bracteae oblanceolatae, ad basim versus angustatae, apice obtusae, basi glabrae vel pilis acutis perpaucis et capillo pluricellulari uno alterove praeditae, fere a medio in margine pilis tenuibus unicellularibus acutis sensim densioribus instructae, capilli pluricellulares (articulati), aurei-rufescentes vel partim purpurascentes praecipue inter bracteas cupulasque dense aggregati; cupula obovoidei-obconica, turbinati-subtetragona, cr. 1 mm longa, 0,5 mm diam., fere glabra, capillo pluricellulari aurei-rufescente uno alterove valde sparso obsita, infra calycem in aculeos 4 breves primo fere 1 mm longos apice glochidibus 4—6 parvis paulum inaequilongis armatos exiens; sepala 4, cr. 0,8 : 0,3—0,4 mm, late elliptica, obtusa, apice intus dense breviter papillosa, ceterum glabra; stamina 2, parva, sepalis breviora; filamenta gracilia, 0,4—0,5 mm longa; antherae reniformes, utrinque emarginatae, cr. 0,17 mm longae, 0,3 mm latae; stylus cr. 0,5 mm longus, stigma purpureum, subpatelliforme, plumosi-flabellatum, diam. 0,8 mm; cupula in statu fructifero 1,5 mm longa, 1 mm diam., aculeis porrectis purpurascenter suffusis 1—1,5 mm longis.

Die Belege unterscheiden sich hinsichtlich der Farbe und Behaarung der Blättchen-Unterseite etwas von einander: Nr. 380 ist unterseits kaum grau, mehr blassgrün, die Behaarung ist unterseits fast ausschliesslich auf die Mittelader beschränkt, Nr. 395 ist ähnlich, zeigt aber auch auf den Seitenadern I. Ordnung unterseits meist ziemlich deutliche Behaarung, Nr. 539 dagegen ist unterseits ausgeprägt graugrün (ob infolge der bei dieser Form stärker als bei den andern beiden Nummern ausgeprägten Papillosität der Unterseite?), ausserdem sind Mitteladern und Seitenadern I. Ordn., teilweise sogar die II. Ordn. dicht mit anliegenden spitzen Haaren bedeckt.

Diese Art, von der SKOTTSBERG von seiner ersten Reise nach Juan Fernandez nur blüten- und fruchtlose Zweige heimgebracht hatte, wurde von mir in meiner Gesamtschrift über die Gattung (Biblioth. botan. Heft 74, S. 75) zweifelnd zur Sect. III *Subtuspapillosae* Bitt. gestellt, zu der die südchilenische *A. pumila* Vahl und die nur auf den beiden hawaiischen Inseln Maui und Kauai vorkommende *A. exigua* A. Gray gehört. Dass sich *A. masafuerana* von diesen beiden Arten erheblich unterscheide, betonte ich schon damals und wies auch auf ihre Übereinstimmung in Tracht und Behaarung mit verschiedenen Angehörigen der Section V *Acrobyssinoideae* hin. Die schönen, vollständigen Belege von SKOTTSBERG's zweiter Reise liessen leicht feststellen, dass diese auf Masafuera endemische Art besonders an den Blüten- und Fruchtorganen sämtliche für die Section *Acrobyssinoideae* bezeichnenden Merkmale besitzt: Blüten in einem endständigen kugeligen Köpfchen vereinigt; mehrzellige (gegliederte) goldbraune bis purpurne Haare reichlich zwischen den Brakteen und am Grunde der Cupulae; Cupula 4-kantig-kreiselförmig mit nur 4 in einer Ebene nahe unter dem Kelche stehenden Stacheln, die nur an der Spitze mit einigen (4—6) Widerhaken (Glochiden) ausgerüstet sind.

A. masafuerana steht der *A. antarctica* Hook. f. (Feuerland und westl. Magellansgebiet) und *A. microcephala* Schlchtdl. (Süd-Chile) nahe, sie unterscheidet sich von der ersteren durch die viel schwächere, niemals gelbliche Behaarung der Blätter und durch das Vorhandensein von 1—2 kleinen Blättern am Blütenstandstiel (scapus), von *A. microcephala* durch erheblich kleinere Blättchen mit weniger Randzähnen.

Im Mesophyll der Blattscheiden von *A. masafuerana* sind die reihenförmig angeordneten Drusen aus Calciumoxalat, wie sie in meiner Gesamtdarstellung: Biblioth. botan. Heft 74, S. 62, Fig. 10 für *A. lucida* Vahl abgebildet sind, besonders schön zu sehen.»

Area of distribution: Endemic in Masafuera.

67. **A. ovalifolia** Ruiz et Pav. subsp. **australis** Bitt. l. c. 239; SKOTTSBERG, Stud. 9.

Masatierra: On both sides of the Portezuelo ridge, on the north side from 250 m in the maqui-thickets (fl. $^{3}/_{12}$ 16, no. 35), on the south side scattered from near the pass (fl.-fr. $^{15}/_{12}$ 16, no. 35 b) down to Villagra, in the forest near the road.

The var. *microphylla* Phil. in sched. Herb. Santiago (and Berlin, see BITTER l. c. 238) is most likely the same that I have collected. PHILIPPI's plants were sterile. Professor BITTER remarks to my specimens that he cannot distinguish them from subsp. *australis* Bitt.

var. **insulae-exterioris** Bitt. l. c. 245.

Masafuera: Q. del Mono, in the forest c. 450 m (fl.-fr. $^{12}/_{2}$ 17, no. 460); Q. de las Casas, in the gorge (fr. $^{11}/_{2}$ 17, no. 440); Q. de las Vacas, outer part; Q. de la Lobería; near the Correspondencia Camp, 1100 m (fl. $^{5}/_{3}$ 17, no. 372); Las Torres, 1370 m (if the same form as no. 373?); C. del Barril, 985 m; ridge between Q. Inocentes and Q. Angosta, c. 1100 m; near Las Torres, 1350 m ($^{5}/_{3}$ 17, no. 373, a compact form, apparently not the same as the rest, see below).

Professor BITTER kindly remarks to my collection: »Der var. *insulae-exterioris* Bitt. entspricht n. 400. Nicht nennenswert verschieden ist n. 460 (das eine Exemplar zeigt an den Nebenblättern hie und da ein undeutliches Seitenzähnchen, also Übergang zu den verbreiteteren Formen dieser Art). Die Hochlandsform n. 372 unterscheidet sich von den beiden vorhergenannten Belegen durch auch an den älteren Blättern bleibende dichtere seidig-glänzende Behaarung der Blattunterseite und kompakteren Wuchs der aufrechten, die Blütenstände entwickelnden Triebe. Die am höchsten wachsende Form, n. 373, entspricht der von SKOTTSBERG 1908 zusammen mit *A. masafuerana* gesammelten Pflanze, mit dicht rasigem gestautem Wuchs, kleinen Blättern mit wenigen Blättchen und weniger Zähnchen daran, die bei BITTER l. c. 245 ebenfalls ohne Blüten und Früchten dargestellt worden ist. Auf Grund der abweichenden Form ihrer Nebenblätter: meist jederseits mit einem Zahn sowie umgekehrt der erheblich geringen Zahl der Blättchenzähne (nur 13—15) ist sie von der var. *insulae-exterioris* zu unterscheiden, aber wegen Mangel an Blüten und Früchten von ähnlichen Formen ausserhalb der Inseln nicht sicher zu sondern.»

Area of distribution: Subsp. *australis* from S. Chile to Fuegia and the Falkland Islands; the variety only known from Masafuera.

Acaena argentea Ruiz et Pav. × **Margyricarpus setosus** Ruiz et Pav. subsp. **digynus** Bitter. — Plate 13, fig. 1.

On the open slopes of Masatierra I found a curious plant, which, in general habit as well as in morphological features seemed to stand between *Margyri-*

carpus and *Acaena argentea*. The material was sent to Prof. BITTER, who, after a careful inspection, confirmed my view. He has established the new bastard genus *Margyracaena*, described below with full details.

Masatierra: El Pangal, west branch, dry ridge leading to C. Centinela, c. 250 m, rare (no. 579); V. Colonial, barren ground along the road to Portezuelo before it enters the macal, one small patch mixed with *A. argentea* (no. 562; here the photograph on Plate 13 was taken); between the foot of Yunque and Villagra, 190 m (fl. $^{7}/_{1}$ 17, no. 241 b); B. Villagra, rocky and sandy ridge near the camping place, c. 200 m, several specimens (fl. $^{6}/_{1}$ 17, no. 241).

Area of distribution: Originated in Masatierra, as a result of natural crosses between the native *Margyricarpus* and the introduced *Acaena argentea*.

Professor BITTER kindly communicated the following description:

»**Margyracaena Skottsbergii** Bitter nov. gen. et spec. hybr.

Suffruticosa; rami vegetativi robusti, 4—5 mm diam., decumbentes vel ± ve horizontaliter explanati, in partibus vetustioribus lignosis reliquiis foliorum emortuorum, praecipue vaginis sordide fuscescentibus, ± ve dense involuti, laxiuscule irregulariter ramosi; internodia brevia, plerumque 4—8 mm, rarius 1 cm longa, in statu novello pilis tenuibus longis crebris obsita, serius ± ve glabrescentia, cortice rubri-fusco tandem defoliante obtecta; foliorum vaginae cr. 6—10 mm longae, 7—8 mm latae, subamplexicaules, viridi- vel tandem rubri-fuscescentes, extus pilis longis tenuibus densis subsericei-strigosae, intus flavi-fuscescentes et parcius pilis longis obsitae, apice in stipulas anguste lineari-lanceolatas longe acuminatas acutas simplices vel 2-fidas 7—8 mm longas 2—3 mm latas frondosas in vaginarum marginibus decurrentes exeuntes; petiolus fere nullus; lamina imparipinnata, 5—(plerumque)7-juga; interstitia brevia, 1—3 mm longa, rhachis ergo 15—20 mm tantum longa, utrinque dense subsericei-pilosa; foliola inferiora lineari-lanceolata, longe acuminata, simplicia vel dentibus paucis incisa, 6—9 : 1—2 mm, superiora sensim majora, lanceolata, lateralia basi obliqua, sessilia, infra medium latissima, ad apicem versus sensim acuminata, acuta, 18—20 : 3—4 mm, dentibus in utroque latere 2—3 acutis incisa, foliolum terminale petiolulo 2 mm longo suffultum utrinque sensim angustatum fere medio latissimum cr. 18 : 3 mm, dentibus utrinque 2—3 (raro 4); inter foliola majora praecipue in rhachidis parte superiore foliola minuta nonnulla (3—4) interjecta (1—2,5 mm longa, 0,5—0,7 mm lata) adsunt; foliola omnia subcoriacea, margine revoluta, supra nitida, praeter glandulas minutas breviter stipitatas (microscopice tantum perspiciendas) valde sparsas (densiores in venae mediae parte inferiore tantum) glabra, subtus pilis tenuibus longis albidis densiuscule sericei-villosa, venis supra impressis, subtus fere solum vena media prominente; rami floriferi erecti, breves, cr. 5—8 cm longi, foliis sensim minoribus; inflorescentiae minores pauciflorae in foliorum superiorum axillis, terminalis globosa, diam. cr. 12 mm, in *Acaenae* modum e floribus densis congestis composita, in scapum brevem 1—2 cm tantum longum evecta; bracteae lineares, 2—4 mm longae, acutae, in marginibus pilis tenuibus longis densis instructae, minores 1—2 mm tantum longae, ceterum similes; cupula obconica, dense villosa, immatura a me visa cr. 3 : 2 mm, infra calycem in aculeos 4(—5) breves inaequilongos 2—4 mm, glabros (etiam apice!,

glochidibus ergo omnino destitutos) vel rarius pilis tenuibus longis paucis prope basim (sicut cupula) obsitos rubri-suffusos exiens; sepala 4—5, lanceolata, utrinque angustata, acuta, 2—3 : 1 mm, extus dense sericei-villosa, intus viridia, glabra, subnitida; stamina 3, filamenta gracilia, 4—6 mm longa; antherae reniformes, utrinque emarginatae, 0,8—1 mm longae et latae, purpureae; carpellum 1, rarius 2; styli fere 1,5 mm longi, graciles; stigmata 2—2,5 mm longa, 1,5 mm diam., bilateraliter plumosi-flabelliformia, verisimiliter albida.

Es ist bemerkenswert, dass SKOTTSBERG diese Pflanze an vier verschiedenen Oertlichkeiten auf Masatierra und zwar stets in Gesellschaft von *Acaena argentea* und *Margyricarpus* gefunden hat. Danach scheint sich dieser Bastard leicht zu bilden, wozu die ausgesprochene Windbestäubung der beiden mit einander vergesellschafteten Eltern reichlich Gelegenheit bieten mag.[1]

Der Beschreibung liegt hauptsächlich Nr. 241 zu Grunde, da nur an ihr Blütenstände gefunden worden sind; bei Nr. 562 und 579 traf SKOTTSBERG nur vegetative Triebe an, so dass die Blütenorgane der einzelnen gesondert entstandenen Kreuzungen nicht verglichen werden konnten. In der Ausbildung der vegetativen Organe bestehen kaum nennenswerte Unterschiede: die Zahl der Fiederpaare scheint bei Nr. 241 häufiger 7 zu sein als bei den andern beiden hauptsächlich mit 5—6-jochigen Blättern versehenen Nummern, doch habe ich auch bei ihnen 7-jochige Spreiten gesehen. Die Blättchen sind bei 241 wohl durchgängig etwas grösser und breiter als bei 562 und 579 (bei letzteren messen die obersten Blättchen nur 14—16 : 3 mm), doch könnte dieser geringe Unterschied auch durch Standorts- und Ernährungsverhältnisse hervorgerufen worden sein.

In der Form und Grösse der Blätter und ihrer Teilung nimmt *Margyracaena* deutlich die Mitte zwischen *Acaena* und *Margyricarpus* ein: Verhältnis der Länge der Blattspreiten zu ihrer Breite bei

Acaena (4—)5—8,5 : 3,5—4 (seltener 4,5) cm; *Margyracaena* 2,5—4,5 : 1,5—2,5 cm; *Margyricarpus* 1—1,7 : 1—1,5 cm.

Länge : Breite der Endblättchen bei: *Acaena* (1,8—)2,5—3 : 0,8—1 cm; *Margyracaena* 1,1—1,8 : 0,2—0,3 cm; *Margyricarpus* 0,8 : 0,05 cm.

Die Blättchen von *Margyracaena* sind am Rande deutlicher umgerollt als bei der *Acaena* und weniger stark umgerollt als bei *Margyricarpus*.

Zahl der Zähne an den Endblättchen bei *Acaena* 21—29, *Margyracaena* 5—7, *Margyricarpus* 0.

Die unterseitige Bekleidung der Blättchen ist bei fast allen Varietäten der

[1] In meiner *Acaena*-Monographie, Biblioth. botan. Heft 74, S. 296—321, habe ich eingehend die leichte spontane Kreuzung unter den Acaenen in den botanischen Gärten beleuchtet: man beachte besonders die Bastarde zwischen in der Tracht und im Fruchtbau einander ferner stehenden Arten wie *A. glabra* und *A. sanguisorbae* sowie zwischen *A. glabra* und *A. Hieronymi*. Meine seit Jahren bestehende Absicht, Kreuzung der Acaenen mit andern Sanguisorbeen-Gattungen, z. B. mit *Poterium spinosum, Polylepis, Bencomia* herbeizuführen, hat sich bislang hauptsächlich wegen der Ungleichzeitigkeit der Blütenentwicklung nicht verwirklichen lassen. Hoffentlich gelingt es mir, zwischen einer vom chilenischen Festlande stammenden Form der *Acaena argentea* und der (im Gegensatze zu der zweikarpelligen subsp. *digynus* von Masatierra) mit nur *einem* Fruchtblatte in jeder Cupula versehenen festländischen Unterart des *Margyricarpus setosus*, die ich beide lebend in Pflege habe, eine der Masatierra-*Margyracaena* ähnliche Kreuzung zu erzielen.

Acaena argentea (auch bei den auf Juan Fernandez vorkommenden Formen) dicht anliegend silberig seidenhaarig (mit sehr langen, dünnen, einzelligen Haaren), *Margyracaena* ist unterseits ebenfalls reichlich mit feinen, langen, anliegenden Haaren bedeckt, aber dieses Haarkleid ist sichtlich etwas lockerer: neben die weiss-silberige Unterseite von *Acaena argentea* gehalten zeigt die zwar immerhin noch etwas silberige Unterseite von *Margyracaena* einen deutlichen Stich ins Grünliche.

Die Blättchen von *Margyricarpus* sind unterseits frei von einfachen, dünnen Langhaaren und daselbst auf der Mittelader mit winzigen gestielten Drüsenköpfchen versehen, die bei *Margyracaena* zerstreut an derselben Stelle ebenfalls vorkommen.

In der Tracht, besonders in der Form der Blätter erinnert *Margyracaena* mehr an die Gattung *Acaena;* in der Ausbildung der Blütenorgane sind jedoch einige auffällige Merkmale hervorzuheben, die sich mit der *Acaena*-Sektion *Ancistrum,* zu der sie ihrem Äussern nach gehören müsste, nicht in Einklang bringen lassen, zunächst das völlige Fehlen von Glochiden, überhaupt jeglicher Behaarung an der Spitze der Cupularstacheln, ferner das wenn auch seltene Vorkommen von 2 Carpellen in einer Cupula. Auch durch das fast gänzliche Fehlen eines eigentlichen, gestreckten, das endständige Blütenköpfchen tragenden Schaftes weicht *Margyracaena* von den Ancistren ab.

Trotzdem dass reife Früchte von dieser merkwürdigen Pflanze nicht vorlagen, liess sich doch bereits aus der Untersuchung der an den Belegstücken vorhandenen verblühten Cupulae mit genügender Sicherheit ermitteln, dass hier tatsächlich, wie SKOTTSBERG bereits beim Sammeln der Pflanze vermutet hatte, eine offenbar durch Kreuzung entstandene Zwischenform zwischen den beiden, am Fundorte mit einander vergesellschafteten Sanguisorbeen *Acaena argentea* R. et P. und *Margyricarpus setosus* R. et P. subsp. *digynus* Bitt. vorliegt: zu beachten ist besonders, dass die an *Acaena* gemahnenden, bei *Margyricarpus* fehlenden Cupularstacheln bei *Margyracaena* von ungleicher Länge sind, offenbar stets kurz (nur 2—4 mm lang) bleiben und völlig der endständigen Widerhaken (Glochiden) ermangeln, während die Cupularstacheln von *Acaena argentea* 6—7 mm lang werden und an der Spitze stets mit 4—6 kräftigen Glochiden ausgerüstet sind.

Besondere Beachtung verdient übrigens, dass auch *Margyricarpus setosus* längs verlaufende hervortretende Kanten an den noch unreifen Früchten besitzt, die jede mit einigen niedrigen Höckern versehen sind; im reifen Zustande verschwinden jedoch diese Kanten mit ihren Höckern äusserlich vollständig, da die Cupula beerenähnlich fleischig wird und zu einem fast kugeligen Gebilde anschwillt; erst beim Trocknen treten die höckerigen Kanten infolge des starken Einschrumpfens der weicheren Cupularteile wieder deutlicher hervor.

Man wird vielleicht an der Cupula von *Margyracaena* Andeutungen von der im reifen Zustande etwas beerig saftigen, kugeligen Ausbildung der Cupula von *Margyricarpus* vermissen; ich betone jedoch, dass ich an lebenden Exemplaren von *Margyricarpus setosus* erst kurz vor der völligen Reife die scheinbeerenähnliche Entwicklung der Cupula habe bemerken können. Da hier nur unreife, vielleicht wegen der aus zwei einander sehr fern stehenden Arten entstandenen Kreuzung niemals zu voller Entwicklung gelangende Früchte vor-

liegen, so wird man nicht notgedrungen etwas von einer Annäherung an den *Margyricarpus*-Bau zu beobachten brauchen.[1]

Als Abweichung der *Margyracaena* von den *beiden* Eltern sind zu nennen 1) die oft etwas grössere Zahl der Fiederpaare an den Laubblättern: bei *Margyricarpus* 4—5, bei *Acaena* 5, seltener 6, bei *Margyracaena* 5—(meistens)7; 2) die tieferen Blättchenzähne der *Margyracaena* an allen Blättchen; *Acaena argentea* besitzt dagegen nur an den unteren Blättchen jeder Spreite etwas tiefere Sägezähne, an den oberen, voll ausgebildeten Blättchen ist sie nur kerbig-gesägt, die Blättchen von *Margyricarpus* sind völlig ganzrandig. Offenbar hängt das stärkere Hervortreten der Sägezähne an den *Margyracaena*-Blättchen aber mit der im Vergleich zu *Acaena argentea* stärkeren Umrollung des Blattrandes zusammen, die als Erbstück von *Margyricarpus* herrührt: die Randumrollung ist bei *Margyracaena* allerdings bedeutend schwächer als bei *Margyricarpus;* da sie aber an jedem Zahn von beiden Seiten her erfolgt, so erscheinen die Zähne bei ihr etwas schmäler, länger und spitzer als bei der kaum oder gar nicht umgerollten *A. argentea.* — Ob die im Vergleich zu *Acaena* etwas grössere Zahl der Seitenfiedern der *Margyracaena* auf Rechnung des bei Bastarden oft zu beobachtenden üppigeren Wachstums der vegetativen Teile zurückzuführen ist, muss dahin gestellt bleiben.

Je länger ich mich mit dem Vergleiche der *Margyracaena* mit den beiden Elternarten beschäftigt habe, um so mehr sind meine anfänglichen Zweifel an ihrer Entstehung behoben worden. Gerade in den entscheidenden Punkten, der Ausbildung der Fruktifikationsorgane, dürfte der *Margyricarpus*-Einschlag bei dem Gattungsbastard unverkennbar sein.»

Leguminosae.

Sophora L.

In Bot. Zeitung XIV (1856) 642 PHILIPPI described a *Sophora,* collected by GERMAIN in Masatierra, as *Edwardsia fernandeziana.* In the same journal for 1873, 743, he added *E. Reedeana* from Masatierra and *E. masafuerana* from Masafuera. Of this he had only sterile material, the flowers, but not the fruit, being known in the other two.

HEMSLEY, l. c. 32, and JOHOW, Estud. 88, reduced all to *S. tetraptera* J. Mill., Ait.; still, PHILIPPI had indicated a difference worthy of some attention,

[1] Übrigens sei bei dieser Gelegenheit bezüglich der bei *Margyracaena* trotz der wahrscheinlich stets tauben Früchte vorhandenen, zwar kleinen, aber doch deutlich ausgebildeten Cupularstacheln bemerkt, dass sich diese Organe nach meinen Erfahrungen bei rein weiblichen *Acaena*-Pflanzen auch dann gut ausbilden, wenn die Blüten wegen Fehlens männlicher Exemplare unbefruchtet bleiben und nachweislich taub sind, wovon ich mich seit Jahren an einer im botanischen Garten befindlichen, reich wuchernden und sich durch unterirdische Ausläufer vermehrenden weiblichen Pflanze von *A. macrostemon* subsp. *pachystigma* Bitt. (in *Acaena*-Monographie, Biblioth. botan. Heft 74, S. 192) überzeugt habe. Auch rein weibliche, von männlichen und monoezischen Exemplaren völlig abgesonderte Pflanzen der Sanguisorbee *Bencomia caudata* bilden ihre kugeligen Fruchtcupulae gerade so aus als ob sie reife Samen enthielten. (Weitere Beispiele zu der in den letzten Jahrzehnten an verschiedenen Pflanzen nachgewiesenen Erscheinung der Parthenocarpie!)

for the petals in the species from Masatierra were described and figured with a distinctly longer nail than in the species from the continent or from New Zealand. In 1908 I only got scanty material, but the Masafueran *Sophora* was found with pods. As these were smooth and entirely unwinged, I separated the island forms as subsp. *fernandeziana* (Phil.) from the ordinary *S. tetraptera*. This time I have a large material at hand, having also studied the collections in Santiago and Kew.

All plants from Juan Fernandez differ from Chilean or New Zealand Sophoras in the smaller number of leaflets, the smaller flowers, the longer nails of the petals, and in the unwinged pod. It is noteworthy that there is, in New Zealand, a species with small flowers, narrow-winged pod and only 2—4 pairs of leaflets, *S. prostrata* Buchan. In some respects, this comes nearer to the Juan Fernandez forms, but is, of course, quite distinct.

Of PHILIPPI's species, *Edw. masafuerana* is easily distinguished, as seen from my description and figures. All specimens collected in Masafuera (GUAJARDO! — the type —, JOHOW! and the writer) are exactly like each other and rather unlike all forms from Masatierra. The difference between *Edw. Reedeana* and *fernandeziana* appears to be slight. My figures were prepared from PHILIPPI's type material; they show a certain difference in the shape of the petals. PHILIPPI described the leaflets of *fernandeziana* as spathulate, but his figure (pl. VIII B) shows an almost elliptical leaflet; comp. also my fig. 12 a, *l.* Unfortunately, none of my specimens are in flower, what makes the identification with PHILIPPI's forms uncertain. No. 322 from Pto Ingles has 8—14 pairs of narrow elliptical leaflets, densely villous with reddish or silvery hairs, indicating that they were not fully developed. The same form was collected by BERTERO (no. 1516! Herb. Kew); here the leaflets have attained full size and show a tendency to become slightly spathulate. I believe I am right in bringing these to *fernandeziana*.

No. 599 from Vaquería, also found in Q. Juanango, where mature pods were gathered, is a robust form with 8—10 pairs of large leaflets (13—14 × 5—8 mm). I bring this to Reedeana. Seeds were sown in the Gothenburg Garden in 1918, but the plants are still (Sept. 1921) rather weak and differ from the parents in being nearly glabrous, probably a direct result of greenhouse life. Nos. 63 and especially 214 differ from the former by their very slender twigs; the leaflets are broader, perfectly glabrous above and with few hairs below; there are 8—10 pairs in no. 63 (size 8—10 × 5 mm) and 6—8 pairs in no. 214 (size 6—8 × 4—5 mm). Both are sterile. I distinguish these plants as f. *gracilior*. With regard to the marked variation in the Masatierran Sophoras, I for the present comprise all forms under the specific name *fernandeziana*. *S. Reedeana* is retained as a variety, so that it be not forgotten. A definite arrangement can be made only after an examination of a larger material, with flowers and pods of all the forms.

Finally, I shall say a few words about the Sophoras of Chile and of New Zealand. *S. tetraptera* occurs in the latter place in two distinct forms or species, *S. grandiflora* (Salisb.) and *microphylla* Ait. No specimen from Chile that I have come across matches *S. microphylla*, but all are very like *S. grandiflora* in most respects. As a rule, the leaflets number 10—20 pairs in both, they may be a trifle broader and more oval in the Chilean plant, but this is

hardly a reliable character. The standard is more orbicular in the latter, if always, I cannot tell, and the flower smaller. PHILIPPI tried to find some difference in the calyx, but without much success (comp. my figures 12 d, e and g). The seeds of the Chilean plant are ellipsoidal, slightly compressed from the sides, castaneous, 6—7 mm long and 4—4,5 mm broad. I have not seen the seeds of *S. grandiflora;* in *microphylla* I found them dirty yellow or yellowish brown, see plate 20, fig. 3—4. For comparison also the seeds of *S. toromiro* (Phil.) Skottsb. were figured, differing from those of all the others in colour, size and shape.

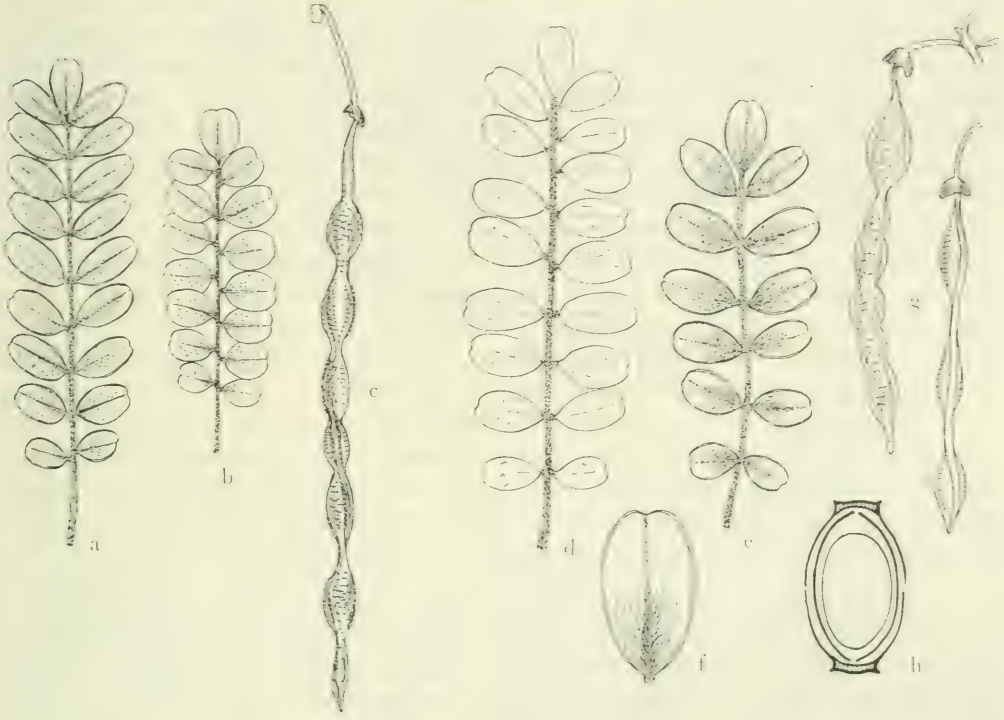


Fig. 11. **a—c** *Sophora fernandeziana:* **a** leaf of no. 63, lower side, **b** of no. 214 (f. *gracilior*), nat. size; **c** mature pod of no. 599, ½ nat. size. **d—g** *S. masafuerana:* **d** upper, **e** lower side of leaf, nat. size, **f** lower side of leaflet, × 2; **g** mature pods, ½ nat. size. **h** dehiscence of *Sophora* pod, schematic cross section.

We cannot, I think, simply use the name *S. tetraptera* for the Chilean plant. PHILIPPI called it *Edw. macnabiana* Grah. Edinb. New Phil. Journ. 26 (1839) 196 (figured in Bot. Magaz. 66, pl. 3735). GRAHAM's description was based on a tree cultivated in the botanic garden of Edinburgh; it is not stated where the seeds came from. The main difference between this and the New Zealand plant was that the former »flowered when in full leaf» and was more hardy. I have seen *Sophora* in flower in some places in south Chile. The leaves are generally, but not always, shed before the flowers open, and the new foliage gets developed with the fruit. — I cannot find that *Edw. cassioides* Phil. is different.

The pod of *Sophora* has an interesting structure. CHEESEMAN, Manual 122,

writes under *Sophora:* »pod ... indehiscent or 2-valved, each seed enclosed in a separate cell», and, under *S. tetraptera:* »valves hardly dehiscent». I have seen opened pods in several species; a diagrammatic section is given in fig. 11, h.

68. **S. fernandeziana** (Phil.) Skottsb. — Fig. 12 a.

Arbor plurimetralis robusta, cortice obscuro cinereo-fusco sat tenui parum striato, vetusto quasi squamoso. Folia 6—8 cm longa, rhachide sat dense rufo- vel cinereohirsuta paulo complanata et sulcatula; foliola 8—12(—14)-paria, elliptica vel elliptico-lanceolata, basi et apice obtusa, interdum minute emarginata, 8—12(—15) mm longa et 3,5—4(—6) lata, obscure viridia, subtus pallidiora, supra pilis brevibus cinereis vel rufescentibus inspersa, subtus magis sericea, serius utrinque glabrata. Flores quam in S. tetraptera e Novozelandia orta minores, sec. specimina Philippiana a cl. GERMAIN lecta infra depicti. Calyx obliquus, 10 mm diam. et ad 13 mm longus, dense rufosericeus. Vexillum late ovatum, acutatum, limbo 27 mm longo et 20 lato, ungue cochleato et incrassato, 8 mm longo; alae leviter curvatae limbo ad 25 mm longo et 6 mm lato, ungue 7 mm longo. Carinae petala falcata, limbo 30 mm longo et 5 $^1/_2$ mm lato, ungue ad 9 mm. Stamina ad 30 mm longa, antheris linearibus, 2 mm longis. Ovarium sericeum circ. 2 cm longum leviter curvatum; stylus 1 cm, glaber recurvus. Legumen immaturum in specim. nostris num. 322 2—6-locellatum, exalatum. PHILIPPI folia mox caduca solum vidit et illa glabriuscula dixit, sed in ejusdem typo foliola satis villosa sunt.

Masatierra: BERTERO no. 1516! GERMAIN! Scattered in the forest belt from near the sea level to a few hundred meters. — Pto Frances (JOHOW); Pto Ingles, central ridge, 380 m (unr. fr. $^{19}/_1$ 17, no. 322). The following localities belong to this or to one of its forms: NE. slope of Damajuana, c. 450 m; V. Colonial, Q. del Monte Maderugo, steep rocks, 390 m.

var. **Reedeana** (Phil.) Skottsb. — Plate 20, fig. 1; text fig. 11 c, 12 b, 13 b.

Foliola 8—11-paria, elliptica, obtusa, vulgo 10—12 × 5—6 mm, sed usque ad 17 × 8 mm visa, utrinque, subtus praesertim, dense villosa. Flores sec. specimen Philippianum a cl. REED lectum solum descripti. Calyx ut in typo sed minus obliquus, ad 11 mm longus et 10—11 mm diam. Vexillum limbo suborbiculato, obtusissimo, 20 mm longo et 19 lato, ungue crasso lineari 6 mm longo. Alae limbo oblique lanceolato, basi subcordato, 21 × 6,5 mm, ungue 7 mm longo. Carinae petala minus falcata, limbo 24 × 7,5 mm, ungue 7 mm. Stamina ad 28 mm longa, antheris anguste ovatis 2,5 mm longis. Ovarium ut in typo. Legumen maturum in specim. nostris 599 nec non 1238 inventum, magnum, durum, fuscum nec non pilosiusculum, ad 19,5 cm longum (pedicello 2,5 cm), locellis ellipticis 9—10 mm longis compressis, alis destitutum sed anguste 4-limbatum. Semina pro genere magna, elliptica, compressa, 8 mm longa, 4—5 lata et 3—4 crassa, castanea, nitidula.

Masatierra: REED! — La Vaquería, c. 250 m, many large trees in the bottom of the valley in dry open forest (fr. $^9/_4$ 17, no. 599); Q. del Juanango, c. 200 m (fr. $^9/_4$ 17, no. 1238).

f. *gracilior* n. f. ad int. — Fig. 11 a—b, 13 a. — Specimina sterilia foliis adultis solum visa; a ceteris differunt ramulis gracillimis nec non rhachide

Fig. 12. Analysis of *Sophora* flowers: **a** *S. fernandeziana* orig. GERMAIN; **b** *S. Reedeana* orig. REED; **c** *S. masafuerana* leg. JOHOW (standard missing); **d** *S. »tetraptera»* from Chiloé leg. SKOTTSBERG; **e** *S. »macnabiana»* from Valdivia, leg. PHILIPPI; **f** *S. microphylla* and **g** *S. grandiflora* from New Zealand. All nat. size. — *k* keel, *w* wing, *s* standard, *c* calyx, *l* leaflet, lower side.

foliorum tenui; foliola minora, pro longitudine latiora, glabriuscula. Folia 4—7 cm longa; foliola 6—8(—10)-paria, suborbiculata—late elliptica obtusissima et emarginata, supra glabra, subtus hirsutula, 6—9 × 3,5—6 mm. **Masatierra:** Q. Damajuana, one tree near the stream, 250 m (no. 63) and higher up on the slope, 345 m, a few trees (no. 214).

Area of distribution: Endemic in Masatierra.

69. **S. masafuerana** (Phil.) Skottsb. — Plate 20, fig. 2; text fig. 11 d—g, 12 c, 13 c.

Arbor pumila paucimetralis ramis longis tenuibus subflexuosis cortice nigrescente. Folia 5—7 cm longa rhachide dense ac longe albo-villosa; foliola 6—10 paria, elliptica-subobovata, obtusissima saepe paulo emarginata, margine ± revoluto, 8—12 × 5—6 mm, obscure viridia, subtus pallidiora, supra glabra, subtus inferne et secus medianum pilis albis longis patentibus dense vestita, ceterum parce pilosa et glabrescentia. Flores sec. specimen a cl. JOHOW lectum descripti. Calyx late campanulatus, 9 mm longus, ad 13 mm diam., obsolete 5-dentatus, fulvosericeus. Vexillum non visum. Alae ovato-lanceolatae, limbo 24 × 8 mm, ungue 6 mm; carinae petala anguste ovata, subobliqua, limbo 28 × 10, ungue 7 mm. Stamina ad 26 mm longa, antheris anguste ovatis 1,5 mm longis. Ovarium dense albolanatum ad 22 mm longum; stylus subrectus glaber, 8 mm longus. Legumen maturum 8—11 cm solum longum, irregulariter 3—7 locel-

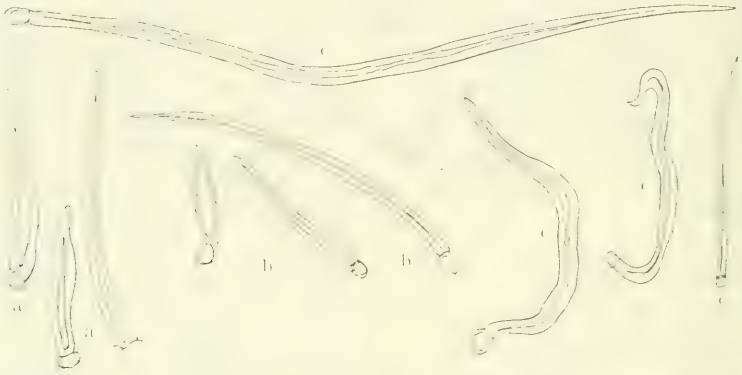


Fig. 13. Hairs from leaves of a *Sophora fernandeziana* (no. 214), b var. *Reedeana* (no. 599), c *S. masafuerana;* much enlarged.

latum, locellis 8—10 mm diam., obscure fuscum, albopilosum, omnino exalatum, marginibus laevibus vel paulo tuberculatis. Semina haud compressa, obscure castanea—flavescentia, 6—7 mm longa et 4—6 mm crassa.

Masafuera: GUAJARDO! JOHOW! — Q. de las Casas, on shelves along the walls of the gorge (fr. $^{11}/_{2}$ 17, no. 504); Q. de las Vacas (JOHOW); Q. Angosta; Q. del Varadero.

This differs from all other forms in the pubescence of the leaflets, illustrated above; part of the hairs are longer and more crisp than in *S. fernandeziana,* as Fig. 13 shows. There is also considerable difference in the flower and, still more so, in the pod. Besides the characters given the smooth surface of the pod and the thinness of its walls are to be remembered. The wings, of which there is a vestige in the former, are quite wanting or, at most, represented by an irregular row of tubercles. The variation in the colour of the seed should be noted.

JOHOW says that he found a form of *Sophora* in Masafuera differing from PHILIPPI's species, but his material certainly belongs to the latter.

Area of distribution: Endemic in Masafuera.

Rutaceae.

Fagara L.

70. **F. mayu** (Bert., Hook. et Arn.) Engler. — JOHOW, Estud. 105. — Fig. 14 a—d.

Masatierra: The largest forest tree and one of the commonest, ranging from Pto Frances to Q. Juanango and Co Chumacera and from about 200 m (or less) to more than 600 m (unr. fr. Dec. 1916, no. 194; buds $^{11}/_{4}$ 17, no. 617; male fl. $^{18}/_{8}$ 17, no. 617 b, leg. K. BÄCKSTRÖM).

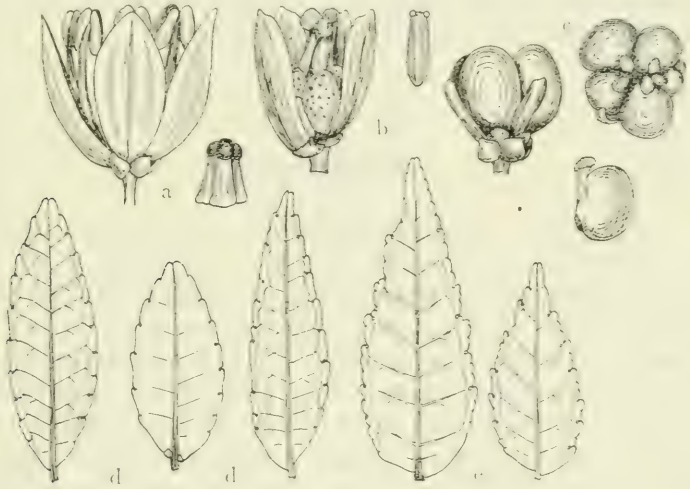


Fig. 14. a—d *Fagara mayu:* a ♂ flower with gynaeceum, b ♀ flower (one petal removed) with staminode, c ♀ in fruit, lateral and apical view, and one carpel, all × 5; d three leaflets, the central from the lower surface; e *F. externa*, two leaflets. d—e nat. size.

Leaves to 16 cm long, 3—7 paired; leaflets 25—43 × 11—13 mm, elliptical—lanceolate, faintly or not acuminate, base cuneate, short petiolate; glands between the marginal teeth distinct but otherwise few or at least few pellucid ones. Margin of leaflet forming a regular arch; the teeth only 7 to 9 on each side and mostly all of the same width.

Area of distribution: Endemic in Masatierra.

*71. **F. externa** nov. spec. — Fig. 14 e.

A F. mayu insulae Masatierrae incola praecipue differt foliorum fabrica. Folia ad 19 cm longa, 5—8 paria; foliola subsessilia, ovato-elliptica, basi late rotundata, sat longe et distincte acuminata, 25—48 × 13—15 mm, margine dentibus inaequalibus utroque latere ad 20 vel ultra sat irregulariter undulato-serrata, punctis pellucidis creberrimis conspersa. Planta foeminea fructifera solum lecta. Fructus maturus irregulariter tuberculato-rugosus; carpella omnia quinque saepe fertilia. Semina subglobosa, nitida, atropurpurea.

Masafuera: Forest on the Sanchez plain, 515 m; Q. del Mono, c. 475 m (fr. $^{20}/_{2}$ 17, no. 521); Q. del Blindado, 440 m, not uncommon; Q. de la Lobería, 280 m, solitary trees.

Unfortunately, I did not pay sufficient attention to this form while in Masafuera. Back again in Masatierra, I began to realize that the »mayu» in the other island was different. I do not remember having seen any very large trees in Masafuera. Of *F. mayu* I have seen the specimens collected by BERTERO, CUMING, MOSELEY and PHILIPPI, and all agree perfectly well with each other. In JOHOW's herbarium specimens from Masafuera were missing. This is much to be regretted, as a comparison would have been quite useful. I have figured the flowers of *F. mayu;* those of *F. externa* are unknown, but there is little or no difference in the fruit and seeds. Still, the leaves are so different that I have ventured to create a new species.

Area of distribution: Endemic in Masafuera.

Euphorbiaceae.

Dysopsis Baill.

72. **D. glechomoides** (Rich.) Müll. Arg. subsp. **hirsuta** Müll. Arg. — JOHOW, Estud. 103.

Masatierra: The commonest herb of the dark, humid forests, thriving in very shady corners where few other species grow and sometimes carpeting the soil for many square meters. Pto Frances (also observed by JOHOW), primeval forest, c. 500 m; forests of the Yunque, very common about 500 m; V. Colonial, Q. Gutierrez, c. 350 m (fl.-fr. $^{7}/_{12}$ 16, no. 42); steep slopes near Portezuelo (also JOHOW), 450–600 m, common (fl.-fr. $^{24}/_{12}$ 16—$^{31}/_{7}$ 17, no. 42 b); Q. Seca, 435 m, common; C. Salsipuedes, common in *Dicksonia*-rich forest c. 600 m; Q. Villagra, in many places; Q. de la Choza, 3—400 m, not unfrequent.

The island form, which was the type of a species in Herb. BERTERO, but not described by him, seems to be very constant. It differs from the two continental forms in the dense pubescence, the more oblong leaves and the smaller seeds. MÜLLER ARG. distinguished the Chilean form as the type and called the island plant var. *hirsuta.* I have been inclined to regard the latter as a species. GRÜNING, in »Pflanzenreich» Vol. IV, Pt 147: 8, p. 286, retains the forms as varieties; I prefer to regard them as geographical subspecies, as they inhabit widely separated areas and transitions are unknown. Subsp. *genuina* ranges from Chillan to Fuegia, *hirsuta* is endemic in Masatierra and *paucidentata* only known from the Andes of Ecuador. *D. *hirsuta* is perennial and not, as says GRÜNING, annual *or* perennial; the stamens are mostly six and not three; the petiole often measures 2 cm.

Area of distribution: Endemic in Masatierra: see above.

Empetraceae.

Empetrum L.

*73. **E. rubrum** Vahl.

Masafuera: On the top of Los Inocentes, c. 1500 m (no. 379).

An important addition to the magellanic element. Only one large and very old shrub had been discovered when the impenetrable mountain fog closed upon us and forced us to abandon the summit. The specimen was without flower or fruit, but the leaves are quite like those of *E. rubrum*, such as I have collected it in many places in the south.

Area of distribution: Cordillera of Valdivia to Fuegia and the Falkland Islands.

Rhamnaceae.

Colletia Comm.

74. **C. spartioides** Bert. ex Colla. — JOHOW, Estud. 104.

Masatierra: BERTERO! — Rocky places in the forest region, rare. Pto Frances (acc. to GAY); El Pangal, east wall of the gorge, not far from the waterfall, c. 220 m (fr. $^{1}/_{1}$ 17, no. 226, also found by JOHOW); NE. precipice of Co Damajuana, 500—550 m; V. Colonial, Q. del Monte Maderugo, 390 m (fr. $^{24}/_{1}$ 17, no. 336); Pto Ingles, on the central ridge in a very steep place on the west slope (fr. $^{19}/_{1}$ 17, no. 320).

Seeds ovoid, slightly keeled on their ventral side, 3,5 mm long, very dark brown to almost black, highly polished. JOHOW describes the leaves as »escasísimas, pequeñas i rudimentárias», but in the young shoots they are numerous and of regular size. The branches soon become leafless.

On BERTERO's label is written: »in sylvaticis petrosis montium editiorum». GAY, Bot. II. 35, quotes *Colletia* from Pto Frances and says that it flowers in March. JOHOW lists as collectors only BERTERO and JOHOW, but, as seen above, the species is not quite so rare as has been supposed.

Area of distribution: Endemic in Masatierra.

Flacourtiaceae.

Azara Ruiz et Pav.

75. **A. fernandeziana** Gay. — *A. serrata* Ruiz et Pav. var. *fernandeziana* (Gay) Reiche, Fl. de Chile I. 134; JOHOW, Estud. 109. — Fig. 15 a.

Masatierra: In the montane forest, supposed by JOHOW to be limited to a single locality, but found in many places by the writer. Only a single or some few trees were observed in each place. — C. Chifladores, small valley facing the Frances Valley, solitary, c. 500 m; on the ridge separating Q. Laura

from Q. Piedra Agujereada, c. 500 m, rare; V. Colonial, below Portezuelo, c. 450 m, one large tree in dense forest (fl. $^{3}/_{12}$ 16, no. 8) and 570 m, two small plants; C. Central, c. 400 m; Q. Gutierrez, 350—450 m, rare (fl. $^{7}/_{12}$ 16, no. 41); Q. Seca, c. 500 m; C. Salsipuedes; mountain ridge west of Co Yunque, 530 m; Q. Villagra, 500—550 m, scattered (unr. fr. Apr. 17, no. 584); Q. de la Choza, several trees, c. 300 m.

In Stud. 18 I restored GAY's species, saying that it differs quite as much from *serrata* as this from *lanceolata*. This statement is not correct, for the island species is very near *serrata*. Of the latter I have seen ample material in Santiago and Kew. We learn from the original description (Bot. I. 196), that *A. fernandeziana* has membranous leaves and a fruit twice as long as the calyx, while *A. serrata* has coriaceous leaves and the fruit three to four times as long as the calyx. The only notable difference in STEUDEL's description (Flora 1856, 421) is the glabrous calyx in the former, but the calyx is hairy in both. REICHE tried to distinguish the island form by the broad, thin leaves; JOHOW adds that the berries are pure white, while, in *A. serrata*, they are blue and glaucous. I have not seen any quite ripe fruits of *A. fernandeziana*, but all I have are very dark, and I doubt they would have turned white, had they been left to ripen.

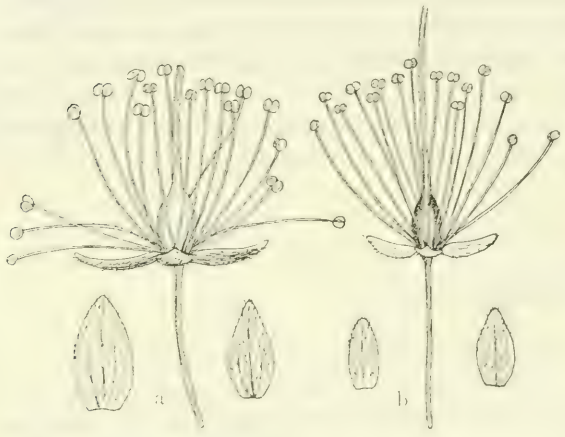


Fig. 15. Flower and sepals of a *Azara fernandeziana*, b *A. serrata*. × 5.

The species is upheld with hesitation. Certainly there are differences (see fig. 15); the leaves are thinner (but not broader, nor are the stipules larger), the pubescence of the stem and peduncles is denser, the sepals 2,5—3 mm long against 1,5—2 in *serrata*, the anthers a trifle larger, the style shorter, 3,5 mm against 4—5 in the other.

Area of distribution: Endemic in Masatierra.

Myrtaceae.

Ugni Turcz.

76. **U. Selkirkii** (Hook. et Arn.) Berg. — JOHOW, Estud. 91.

Masatierra: Common on the highest ridges above the forest, associated with *Pernettya rigida* but much more scarce than this. C. Centinela, 500—800 m; ridges of Co Damajuana, large shrubs (fl. $^{29}/_{1}$ 17, no. 352); V. Colonial, C. Central, 450—570 m; Portezuelo de Villagra, the steep slope of Co Pirámide, 575—600 m (buds $^{22}/_{1}$ 17, fl. $^{31}/_{1}$ 17, no. 329); C. Salsipuedes, 500—700 m.

Area of distribution: Endemic in Masatierra.

Myrteola Berg.

*77. **M. nummularia** (Poir.) Berg.

Masafuera, in the alpine region: near the Correspondencia Camp, 1130 m (fr. 5/3 17, no. 376); C. del Barril, foot of C. Atravesado, 1350 m (past fl.-fr. 1/3 17, no. 548); east slope of Los Inocentes, c. 1200 m, and below the summit, 1350—1400 m (fl.-fr. 9/3 17, no. 377).

Another interesting addition to the subantarctic group. The specimens from Inocentes have almost orbicular leaves, being more »typical», while, in the rest, they are more ovate.

Area of distribution: Chile, Cordillera of Nahuelbuta and Valdivia to Fuegia and the Falkland Islands.

Myrceugenia Berg.

78. **M. fernandeziana** (Hook. et Arn.) Berg. — JOHOW, Estud. 94.

Masatierra: The leading forest tree, common from near the sea level to the high ridges and ranging from Pto Frances to the westernmost forest patches of Q. Juanango and Co Chumacera. Fl. Dec. 1916 (nos. 39, 75); unr. fr. March—Apr. 1917 (no. 575).

Area of distribution: Endemic in Masatierra.

79. **M. Schulzei** Johow, Estud. 96 (as *Schulzii*, but named in honour of Mr. J. Schulze).

Masafuera: The principal forest tree, forming a belt in the valleys between 200 and 800 m, more or less. Fl. Feb. 1917 (no. 505).

Area of distribution: Endemic in Masafuera.

Gunneraceae.

Gunnera L.

80. **G. peltata** Phil. — JOHOW, Estud. 98; SKOTTSBERG, Stud. 12, Fig. 2. Syn. *G. insularis* Schindl. *non* Phil. — Fig. 16 a.

Masatierra: Common in the forested parts, preferring humid ravines, where the stem and leaves attain a very great size. Not seen at a lower altitude than 160 m. It reaches the foot of the high ridges, where intermediate forms between this and *G. bracteata* are found. To the west of Villagra, on the south side of the island, *G. peltata* descends into the ravines below the limit of the forest, reaching its farthest west at the foot of Co Tres Puntas. Fl. ♀-stage Dec. 1916 (nos. 87, 139); fr. Jan. 1917 (no. 139 b).

I have not much to add to my earlier account of this species. This time young plants were found in plenty; they are more or less coarsely villous. The lamina of the first leaves is reniform and not peltate, while the leaves of the

adult plant nearly always are peltate. Inflorescences collected Dec. 1916 had lost their petals and stamens. The stigmas were white in these specimens, not crimson as stated for the plants examined before.

Area of distribution: Endemic in Masatierra.

81. **G. bracteata** Steud. — JOHOW, Estud. 99; SKOTTSBERG, Stud. 10, Fig. 1. Syn. *G. insularis* Phil. *non* Schindl. — Fig. 16 b.

Masatierra: In the central parts of the island, much more rare than the former and belonging to the region of dwarf trees and shrubs along the ridges. Seldom found below 500 m. — El Rabanal (JOHOW); Pico Central (JOHOW); Portezuelo de Villagra, common in the vicinity of the pass, c. 550—600 m (unr.-fr. $^{3}/_{12}$ 16, no. 1; also observed by JOHOW); C. Salsipuedes, scattered in the thickets on the crest, c. 600 m; highest part of Q. Villagra, c. 500 m, with an unusually large stem but otherwise typical. — *Forma foliis plerumque peltatis:* C. Centinela, 700—800 m, common (fr. $^{11}/_{4}$ 17, no. 610). A remarkable form, found in considerable quantities on the high ridge east of Co Yunque. The leaves generally are peltate; this is, as will be shown below, not uncommon in intermediate forms, explained as hybrids, but no. 610 is a typical *bracteata* as to all other vegetative characters. Still, it may not be quite pure.

Area of distribution: Endemic in Masatierra.

[*G. insularis* Phil. (see SKOTTSBERG, Stud. 14). Young plants of *G. bracteata,* collected by the writer, are identical with PHILIPPI's type of *insularis* in Herb. Santiago, leg. GERMAIN 1854!

G. pyramidalis Schindl. (see SKOTTSBERG, Stud. 14). I have tried in vain to get hold of the type; I am convinced that it is not a separate species. The type consists of a piece of an old spike of BERTERO no. 1463, without leaves or ligules. It differs in the very small bracts, considerably smaller than in the top region even, of the other species. I don't know if the bracts in the type are intact; I have seen old spikes where they have disappeared, leaving a stump standing. In Herb. Kew I saw such a piece of BERTERO 1463 (this number embraces all the forms of *Gunnera* from Masatierra); it belongs to *G. bracteata.*]

G. bracteata Steud. × **peltata** Phil. — Plate 13, 2; text fig. 16 c—i.

Near Portezuelo JOHOW found a *Gunnera* with rugose leaves and entire scales, regarded by him as a bastard between the two species. I have found numerous intermediate forms in several places; as hardly one is like the other, I believe they are hybrids and also that the F 1-generation is fertile so that we get an F 2 and following generations. As the two species differ in many characters and as there are so many possibilities to combine these, the theoretical result will be a long series of forms uniting the two extremes, and this is exactly what we find.

The main differences between *peltata* and *bracteata* may be summarized as follows.

G. peltata: Leaves orbicular, reniform of generally peltate, rugose, petiole and lower surface of the blade with scattered tubercles on the larger veins,

upper surface very rugose. Scales crimson, long and narrow, with thick fleshy midrib, densely and deeply lacerate, very hirsute on back. Scape more or less pilose, bracts linear, oblanceolate-acute. Budding parts not very slimy.

Fig. 16. Scales of *Gunnerae:* a *G. peltata,* b *G. bracteata,* e–i intermediate forms — see text! All ½ nat. size.

G. bracteata: Adult leaves orbicular-reniform, smooth, glabrous and lustrous, petiole smooth. Scales green or brownish green, thin, entire, broad ovate, very blunt but sometimes apiculate. Scape glabrous, bracts spathulate. Budding parts embedded in thick mucilage.

Intermediate forms were observed in **Masatierra:** Portezuelo de Villagra, near the road, c. 300 m (no. 1230) and one fine specimen c. 500 m (Plate 13, 2); close to the pass, c. 575 m (fr. $^{2}/_{4}$ 17, no. 585, $^{20}/_{4}$ 17, no. 624); C. Salsipuedes,

600—650 m, common together with the supposed parents (fr. $^{8}/_{12}$ 16, no. 80, $^{13}/_{1}$ 17, no. 80 a, b); Pto Ingles, central ridge, 575 m (fr. $^{19}/_{1}$ 17, no. 323); Q. Villagra, c. 500 m (fr. $^{10}/_{1}$ 17, no. 1218).

The following notes on the leaves and scales of these specimens will give an idea of the range of variation.

No. 624. Fig. 16 c. — Adult leaves all peltate, very rugose below, larger tubercles on veins and petiole few, small; blade almost smooth above. Scales linear—triangular, slightly pilose on back, reddish brown; margins short lacerate. Scape glabrous, bracts mostly gone, remaining ones ± intermediate in shape.

No. 1230. Fig. 16 d. — Leaves peltate, petiole aculeate and pilose, nerves with few tubercles, lower surface rugulose, upper very rough, thus leaves like those of *peltata,* but the lobes more blunt. Scales entire to short lacerate, ovate to linear-triangulate, reddish brown, pilose on back.

No. 585. Fig. 16 e. — Leaves only slightly peltate, otherwise as in *peltata;* scales narrow linear to triangular, reddish brown, shortly lacerate, densely pilose on back. Scape pilose, bracts as in *peltata.* Spike less dense than in this. Budding parts more slimy than in *peltata.*

No. 323. Fig. 16 f. — Leaves not peltate, with acute, serrate lobes, pilose on the nerves below, with few and low tubercles. Scales ovate—triangulate, acute, entire or slightly dentate, brownish green with reddish centre, a little pilose on back. Scape glabrous; no intact bracts left.

No. 80 a. Fig. 16 g. — Leaves slightly or incompletely peltate, slightly rugose below and almost smooth above, petiole strongly aculeate. Scales ovate—triangulate, acute, entire or dentate, greenish brown with reddish centre, glabrous. Scape glabrous, bracts as in *bracteata.*

No. 80 b. — Like the former, but leaves peltate and nearly smooth on both sides. Scales narrower, rarely dentate, slightly pilose on back. Bracts a little narrower.

No. 80. Fig. 16 h. — Leaves peltate, smooth, slightly pilose on the nerves; petiole with scattered low emergences. Scales greenish brown with reddish centre, broad linear—triangular, acute, entire or lacerate in the upper half, almost glabrous. Scape nearly glabrous, bracts of *peltata* type.

No. 1218. Fig. 16 i. — Leaves not peltate, nearly smooth above, slightly rugose and aculeate below. Scales green, ovate—triangular, acute, entire or lacerate, a little pilose on back. Scape glabrous. No intact bracts left.

82. **G. Masafuerae** Skottsb. — Stud. 14, Fig. 3; Taf. 3—4.

Masafuera: known before only from Q. de las Casas, now found in many places and not at all confined to the canyons, but quite common higher up on the mountain slopes or in the shallow ravines in the alpine region. — Along the road to Las Chozas, open spaces in the forest belt; in the higher treeless tracts between 700 and 1100 m, extensive patches in some places; Q. de las Casas, between stones by the stream and on the rock walls of the canyon (unr.-fr. $^{23}/_{2}$ 17, no. 400); Q. de las Vacas, reaching farther down owing to the greater supply of water; Q. del Blindado, in the forest, 440 m; Q. Angosta, by the waterfall; Q. de la Lobería, 280 m, in open forest. Also in the alpine region:

on the western wall of the island, not uncommon; near Las Torres, 1350 m; top of Co Correspondencia, c. 1400 m.

To my description of 1914 the following notes should be added. Old trunks sometimes as much as $^1/_2$ m high and 2 dm across; petiole to $1\,^1/_2$ m long, occasionally as much as 12 cm wide at base; largest lamina measured 2,87 m across. Scales densly pilose on back, as in *G. peltata*. Largest scapes measured 1,67 and 1,75 m, respectively, very heavy, drooping, as much as 26 cm across at base.

This species has larger leaves than the other Juan Fernandez species. Besides by other characters, it is distinguished by the branches of the spike becoming conspicuously incrassate in the fruiting state. The fruit is bright orange red turning crimson when ripe.

In No. 400 transitions were found between normal leaves and the so-called »ligules», showing that the latter are not ligular structures, but reduced leaves, homologous with the large green leaves as well as with the reduced bracts. I shall return to these organs in another paper.

The young petioles of *G. Masafuerae* have a more agreeable, less acid taste than those of *G. peltata;* they are quite refreshing, a fact well known to the islanders, who distinguished *G. Masafuerae* as a special sort of »nalca» (native name for the petioles) long before it was described by the writer.

Area of distribution: Endemic in Masafuera.

Halorrhagidaceae.

Halorrhagis Forst.

A species of *Halorrhagis* was first collected in Masatierra by Mrs. GRAHAM in 1823 and later by SCOULER, BERTERO, CUMING, GERMAIN, PHILIPPI, REED, MOSELEY and JOHOW, also by me in 1908. I have seen specimens brought by all these collectors. SCHINDLER, Pflanzenreich, also quotes J. D. HOOKER, who never visited Juan Fernandez. All the specimens were referred to one species and identified with *Cercodia erecta* Murr. Comment. Goetting. II (1780) 3 tab. 1 = *H. alata* Jacq. = *H. erecta* (Murr.) Schindler, l. c. IV. 225 (1905) 49, fig. 14. The plant from Masatierra goes under one of these names in all publications and herbaria, also in the monograph of SCHINDLER. In 1908, the same name was used by me, on the authority of SCHINDLER. At that time I had no reason to doubt his statements, with one exception, viz. that he quotes *H. erecta* as a native of Chile (GERMAIN); it does not occur on the continent, and GERMAIN's specimens came from Juan Fernandez.

After I had discovered a number of forms in Masafuera, I began to study *H. erecta* from New Zealand and found that the plant from Masatierra was a distinct species. It is evident that SCHINDLER based his description on specimens from both New Zealand and Juan Fernandez (Masatierra).

Before my visit in 1908 *Halorrhagis* had been brought from Masafuera only by GERMAIN. No distinction was made between this and the form in Masatierra. Both are quite smooth, but otherwise very different from each

other. I have seen GERMAIN's plant and I have collected the same species in several places in 1917. The form I found in 1908 was, however, not this, but a very scabrous one, more like the true *H. erecta;* it was mentioned in my account as var. *scabra.* I have found it in many places in 1917, in flower and fruit. It stands very near *erecta,* but must be kept separate.

Thus, *H. erecta* does not occur in Juan Fernandez, but is replaced by three different species. On the other hand, it seems that *H. erecta* of New

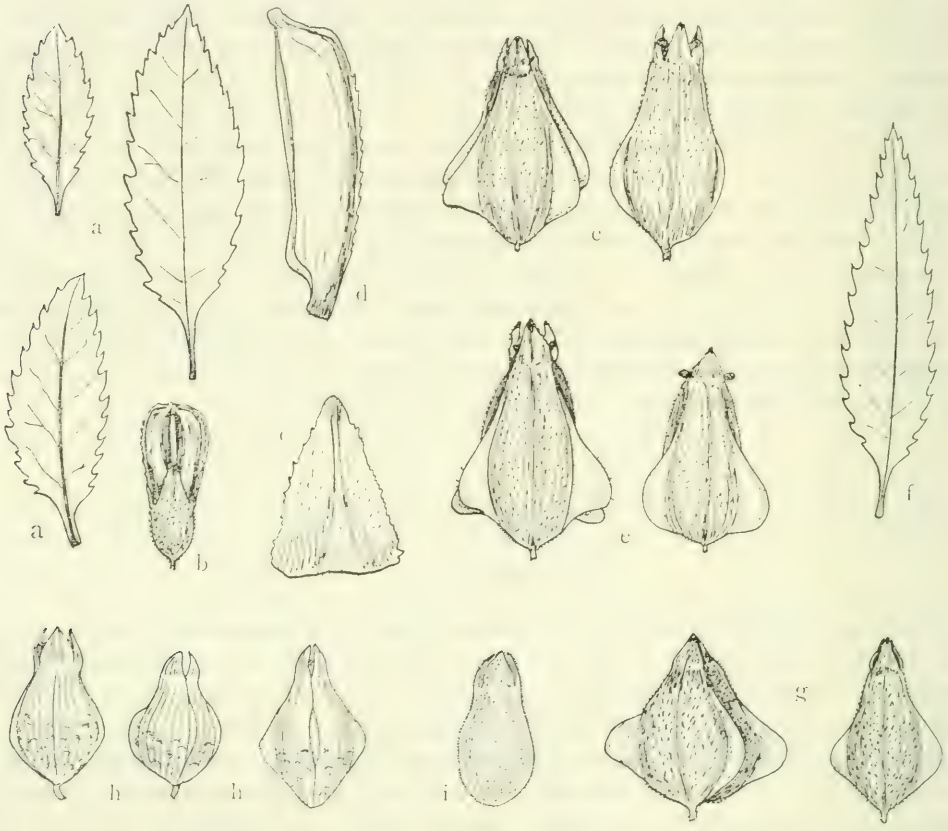


Fig. 17. a—e *Halorrhagis erecta,* cult.: a leaves, nat. size, b bud, × 6,6, c sepal and d petal, × 20, e fruits, × 6,6. f—g *H. erecta* leg. Cheeseman: f leaf, nat. size; g fruits, × 6,6. h fruits of *H. Colensoi* and i of *H. cartilaginea,* × 6,6.

Zealand comprises two distinct plants. MURRAY described a scabrid plant with alate fruits (see fig. 17 a—g). In Herb. Kew I saw specimens of this kind collected by FORSTER, CUNNINGHAM, BUCHANAN, J. D. HOOKER, CHEESEMAN a. o. FORSTER's specimens are less scabrous than the rest. But under the same name was a smooth form collected by COLENSO, with small, barely alate fruits, recalling my *H. masatierrana* in habitus, but differing in the shape and size of the fruit (see fig. 17 h). I have called this *H. Colensoi.*

H. cartilaginea Cheesem., later reduced to a variety of *H. erecta* (Man. N. Z. Flora 148) was justly reestablished by SCHINDLER. It seems to be

a very distinct species (fig. 17 i). To the same subsection Cercodia (Murr.) Schindl. also belong *H. laevis, exalata* and *pedicellata,* all natives of Eastern Australia.

Key to Subsect. Cercodia.

I. Sepals tridentate ..... *H. pedicellata* Schindl.
II. Sepals entire.
  A. Whole plant more or less scabrid.
    1. Densely scabro-velutinous. Leaves thick, broadly ovate. *H. cartilaginea* Cheesem.
    2. Coarsely scabrid. Leaves thin.
      a. Stem with large, scattered hooks. Teeth of leaves pungent. *H. exalata* F. Müll.
      b. Stem with minute prickles, teeth of leaves not pungent.
        α. Leaves barely scabrous. Stigma papillae few-celled. Fruit more than 3 mm long. ..... *H. erecta* (Murr.) Schindl.
        β. Leaves very scabrous. Papillae multicellular. Fruit hardly 3 mm long. ..... *H. asperrima* Skottsb.
  B. Whole plant perfectly smooth.
    1. Leaves large, narrow lanceolate..... *H. laevis* Schindl.
    2. Leaves ovate or broad lanceolate.
      a. Fruit large, generally over 4 mm.
        α. Narrow ovoid, distincly costate. *H. masatierrana* Skottsb.
        β. Broad ovoid, not costate. ..... *H. masafuerana* Skottsb.
      b. Fruit small, c. 3 mm long. ..... *H. Colensoi* Skottsb.

*83. **H. asperrima** nov. spec. — Syn. *H. erecta* var. *scabra,* Skottsberg, Stud. — Fig. 18.

Suffrutex semimetralis, glaber sed scaberrimus, fere a basi opposite ramosus. Rami tetragoni longitudinaliter ac conspicue 4-lineati, lineis elevatis valde scabris. Folia opposita, superiora saepe alternantia, internodiis sat longis separata, tenuia, laete—obscure viridia subtus paulo pallidiora, ubique asperrima, ovata vel ovato-lanceolata, basi cuneato-rotundata, longe (10—18 mm vel interdum ultra) petiolata, lamina argute serrata dentibus distincte apiculatis utrinque 12—14, 30—50 mm longa et 10—22 mm lata, superiora sensim minora, pro magnitudine longe petiolata, anguste lanceolata — ovato-rhomboidea, parcius dentata — subintegra. Inflorescentia spicata foliosa, e dichasiis bracteolatis 3—7-floris composita. Flores brevissime pedicellati ($^1/_2$ mm), omnino scabri. Ovarium tetragono-ovoideum, interdum mox alatum, 1,2—1,5 mm longum et 1 mm latum. Sepala 4 acute triangulata, minute denticulata, 0,8—0,9 mm longa. Petala 4 navicularia, carinata et in carina scabra, breviter unguiculata, 2—2,5 mm longa, viridia—alborosea. Stamina 8 filamentis tenuissimis c. 1,5 mm longis, antheris flavis dorso ± rubescentibus, 1—1,5 mm longis. Styli 4, ad 0,8 mm longi, stigmata alba vel rosea papillis longis multicellularibus. Fructus scaber, viridis—obscure violaceus tetragono ovoideus pyriformis exalatus vel 4-alatus, cum sepalis persistentibus 2,7—3 mm longus et 2 mm latus, inter margines alarum autem ad 4 mm metiens.

Masafuera: SKOTTSBERG 1908, ster. — Q. de las Casas, quite common (fl.-fr. $^{11}/_{2}$ 17, no. 457 — f. fructibus alatis); Q. de las Vacas (fl.-fr. $^{10}/_{2}$ 17, no. 442 — f. non alata); Q. del Blindado, in the forest c. 440 m; Q. del Varadero; on the precipice above Buque Varado, c. 1200 m.

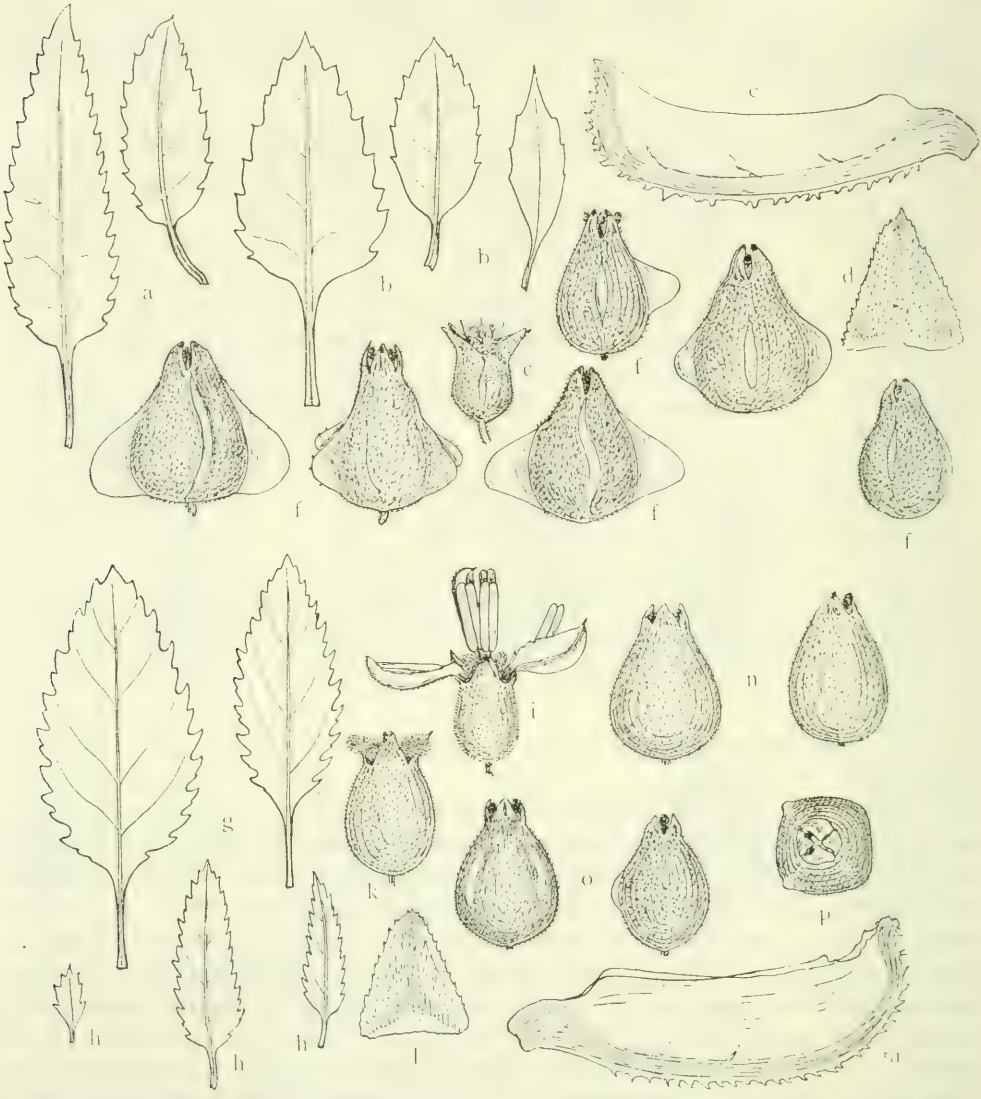


Fig. 18. *Halorrhagis asperrima;* **a**—**f** from no. 457: **a** two lower and **b** three upper leaves, nat. size; **c** flower (petals and anthers removed), × 6,6; **d** sepal and **e** petal, × 20; **f** fruits, × 6,6. **g**—**p** from no. 442: **g** two lower, **h** three upper leaves, nat. size; **i** flower on male and **k** on female stage, × 6,6; **l** sepal and **m** petal, × 20; **n** typical fruits, **o** with trace of wings, **p** one of these seen from the top, all × 6,6.

No. 457 and 442 are so unlike each other that I have been inclined to bring them to different species. No. 457 is wholly green, the leaves are broader, especially in the floral region, the branches thinner, the fruit mostly alate with low, broad wings, see fig. 18 a—f. No. 442 is more or less tinged with antho-

cyanin — though never so bright red as *H. erecta* —, the leaves are narrower, the fruit only slightly tetragonous and mostly without a trace of wings, see fig. 18 g—p. Fruits from both numbers were sown in the Gothenburg Garden and yielded numerous plants; at present I have 13 specimens of no. 457 and 32 of no. 442 in cultivation. The latter are exactly like the mother plant, but the former are unlike no. 457 and habitually very like no. 442. Still, small wings develop in many fruits as in the mother plant, but not so regularly. I suppose the difference in vegetative characters is due to external conditions, but it is less probable that these should influence the development of wings.

H. asperrima is very near *H. erecta,* but this is less scabrous and the leaves are nearly smooth, especially the margin, which, in *H. asperrima,* is thickly beset with microscopic aculei. The stigma-papillae are mostly 2-celled and the fruit 3,5—4 mm long in *erecta.*

Area of distribution: Endemic in Masafuera.

84. **H. masatierrana** nov. spec. — *H. alata* (erecta), JOHOW, Estud. 97, SKOTTSBERG, Stud. 10, *non* Murr. nec Jacq.; SCHINDLER in Pflanzenreich p. p. — Fig. 19.

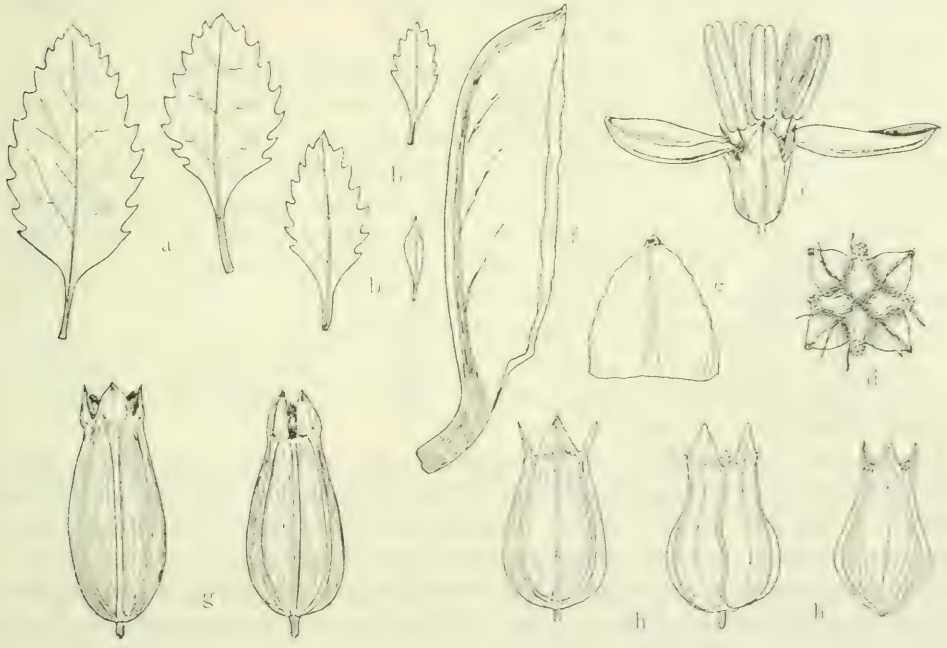


Fig. 19. *Halorrhagis masatierrana:* a two lower, b three upper leaves, nat. size; c flower on male and d on female stage, × 6,6; e sepal and f petal, × 20; g fruits of no. 304, h of JOHOW no. 6, all × 6,6.

Suffrutex 2—5 dm altus, glaber, laevissimus, fere a basi opposite ramosus. Rami cylindraceo-tetragoni, longitudinaliter 4-lineati, cortice ± rufescente. Folia omnia opposita vel superiora florigera alternantia, discoloria, supra laete viridia, subtus glaucescentia, inferiorum lamina ovata, acuta, basi late cuneata, petiolo 3—8 mm longo suffulta, plerumque 15—30 mm longa et 9—14 mm lata,

regulariter serrata dentibus utrinque 6–9, superiora multo minora, paucidentata-subintegra, basi longe cuneata, suprema bracteiformia. Inflorescentia densa vel laxa, foliosa, e dichasiis bracteolatis plerumque 3-floris composita. Flores brevissime (1 mm) pedicellati, omnino laeves. Ovarium subtetragonum et sat distincte 8-lineatum, 0,9—1 mm longum et fere latum, cum pedicello ± rufescens. Sepala 4 late ovato-triangularia, suberecta, 0,9 mm longa. Petala 4 navicularia alborosea carinata, 3—3,5 mm longa, manifeste unguiculata. Stamina 8 filamentis c. 1 mm longis, antheris flavo-roseis 2—2,3 mm. Styli 4, 0,8 mm longi, stigmata rosea papillis pauci-(1—3)cellularibus. Fructus anguste tetragono-ovoideus, in specim. num. 304 cum sepalis 4—4,5 mm longus et 1,7—1,9 mm latus, non alatus sed lineis paulo elevatis 8 notatus, fusco-viridis.

Masatierra: Not rare on the dry, rocky ridges, also on open, stony ground in the forest belt. Rabanal (JOHOW); El Pangal, on the western slope; C. Centinela (JOHOW); V. Colonial, C. Central (also JOHOW), 570 m (fl.-fr. $^{18}/_{1}$ 17, no. 304), Q. del Monte Maderugo, road-side in the macal, 240 m, and rocky wall, 390 m; C. Salsipuedes, frequent, 350—650 m (fl. $^{20}/_{12}$ 16, no. 172); Portezuelo de Villagra, not rare on both sides (fl. $^{3}/_{12}$ 16, no. 34 — also observed by JOHOW); ridge between Vaquería and Q. Juanango, 300 m; Q. Juanango, outer part. South side of the island, Q. Villagra, rare in the forest c. 500 m; east side of B. Chupones, barren slopes.

This differs widely from the typical scabrous *H. erecta,* but it is more like what I have called *H. Colensoi,* especially the more stunted form of *H. masatierrana,* growing on the sunny ridges (no. 34, 172). Of this I got no fruits. JOHOW collected fruiting specimens of exactly the same habitus (no. 6). The fruits of these, only 3,5—4 mm long (but hardly quite ripe) come very near *H. Colensoi,* where, however, they are transversely rugose. Both have traces of wings (see fig. 19 h and 17 h). Still, I believe there is only one species in Masatierra and that *H. Colensoi* is different.

Area of distribution: Endemic in Masatierra.

*85. **H. masafuerana** nov. spec. — Syn. *H. alata,* JOHOW, Estud. 98 quoad plantam e Masafuera. — Fig. 20.

Suffrutex semimetralis patente opposite ramosus glaber laevissimus. Rami cylindracei—obscure tetragoni 4-lineati. Folia subcarnosula laete viridia, inferiora petiolo 8—10 mm longo suffulta, lamina ovato-lanceolata, basi late cuneata, margine incrassata, grosse serrata dentibus utrinque 9—11, c. 45 mm longa et 20 mm lata, superiora sensim minora et brevius petiolata, suprema subrhomboidea subintegra. Inflorescentia laxa foliosa, e dichasiis bracteolatis 1—3 (rarius ad 5)-floris composita. Flores brevissime ($^{1}/_{2}$—1 mm) pedicellati, omnino laeves. Ovarium ovoideum 1,5 mm longum et 1,2 latum. Sepala 4 triangulata margine integro, 1—1,2 mm longa. Petala 4 viridia fusconotata, navicularia, carinata, manifeste unguiculata, 2,5—3 mm longa. Stamina 8 filamentis ad 1,5 mm longis, antheris ad 1,6 mm. Styli sepalis aequilongi, stigmata alba, papillis longis sed paucicellularibus. Fructus pyriformis quam in ceteris major, cum sepalis 4,2—4,6 mm longus, basi 3—3,2 mm latus, fere semper alis omnino destitutus, maturus ± violascens, in sicco obscure 4-sulcatus. Adsunt specimina fructibus tuberculatis nec non alia fructibus irregulariter alulatis.

Masafuera: GERMAIN oct. 1854 (Herb. Santiago!); Q. de las Vacas, on the walls in the outer section (fr. $^{10}/_{2}$ 17, no. 441 — f. tuberculata); stony beach near Varadero (fr. $^{22}/_{2}$ 17, no. 1216); Q. de la Lobería, near the shore (fr. $^{17}/_{2}$ 17, no. 485 — f. alulata).

H. masafuerana differs from all others in the size and shape of the fruit and in the smooth, shiny stems, leaves etc. I have sown seeds of all the different numbers; of no. 1216 I have numerous, of 441 a few plants in cultivation. The difference between them is slight, and the tubercles on the fruit of

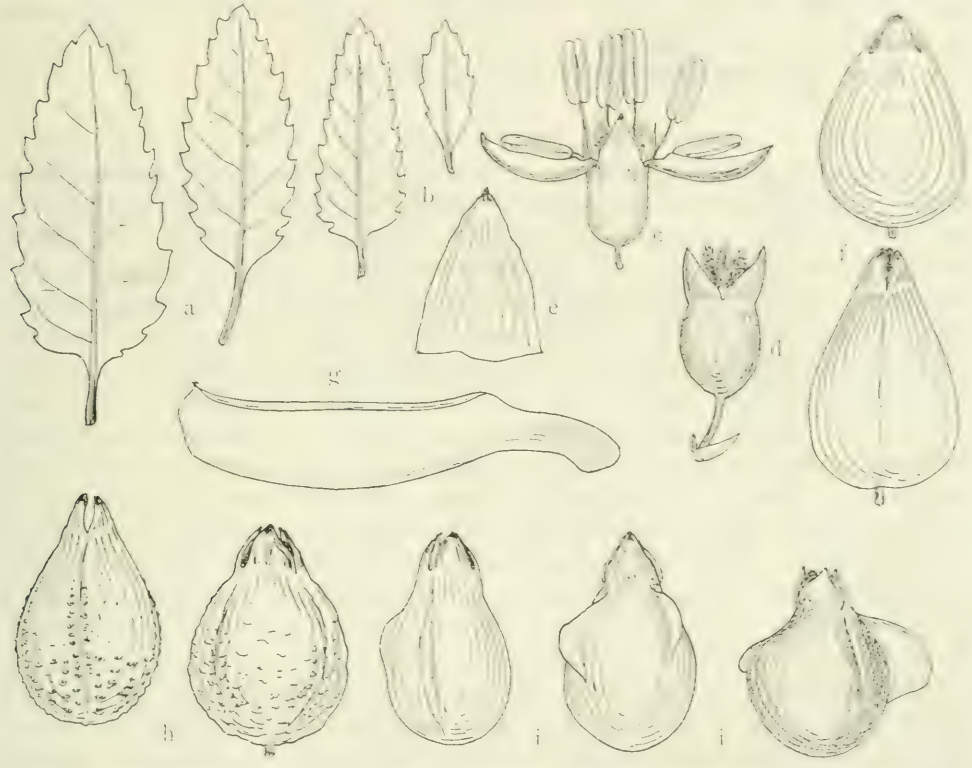


Fig. 20. *Halorrhagis masafuerana:* a–f from no. 1216: a lower, b upper leaves, nat. size; c flower on male and d on female stage, × 6,6; e sepal, × 20; f fruits × 6,6. g–h from no. 441: g petal, × 20; h fruits, × 6,6; i fruits of no. 485, × 6,6.

the latter become pronounced only with desiccation, but are quite wanting even in the dry fruits of no. 1216. More material is needed to decide whether no. 441 represents a distinct variety. Of no. 485, the seeds did not germinate. Fruits of all the forms are figured.

Area of distribution: Endemic in Masafuera.

Umbelliferae.

Eryngium L.

86. **E. bupleuroides** Hook et Arn. — JOHOW, Estud. 100; SKOTTSBERG, Stud. 16, Taf. 5, Fig. 4. — Fig. 21 a–g.

Masatierra: Not uncommon near the limit of the forest, along the higher ridges etc., rarely seen below 400 m. — C. Centinela, rather common on the ridge (also observed by JOHOW); El Pangal, west branch, on the slopes from 400 m; in the gap between Co Damajuana and Co Yunque, c. 580 m; V. Colonial, C. Central, 400—570 m, scattered; Q. del Monte Maderugo, steep slopes 390—500 m (fl. $^{24}/_{1}$ 17, no. 335); Portezuelo de Villagra, on both sides (fl.-fr. Dec. 1916, no. 4, also observed by JOHOW); Pto Ingles, central ridge, c. 470 m; the ridge between Vaquería and Q. Juanango, c. 300 m; forest on a mountain spur west of Co Yunque, 550 m; Q. de la Choza, foot of the steep ridge, 400—450 m; south wall of Co Chumacera.

Area of distribution: Endemic in Masatierra.

*87. **E. inaccessum** nov. spec. — Plate 12. Text fig. 21 h—p.

Arbuscula glaberrima saltem ad $^{1}/_{2}$ m alta, parce pseudodichotome ramosa. Radix primaria profunde infossa parce ramosa. Truncus primarius ad 25 mm diam., cortice fusco leviter longitudinaliter striato et passim transverse rimoso; rami ultimi cicatricibus foliorum densissime annulati. Folia ad apices ramorum densissime rosulata, semiamplexicaulia, sessilia, valde firma, crassiuscula, obscure viridia et subnitida nervis perplurimis parallelis (circ. 5—7 crassioribus) percursa, late lineari-lanceolata, acutissima, apice pungentia, 10—15 cm longa et 1,8—2,7 cm lata, basi 1,6—2 cm; maxima visa 17,5—23 cm longa et 2,8—3,8 cm lata, basi 1,8—2,6 cm; margine angustissime scariosa, infra apicem dentibus acutissimis pungentibus utroque latere 1—4 (plerumque 2—3) munita, rarissime integerrima. Inflorescentia terminalis monocephala, scapo complanato 6—11 cm longo circ. 5 × 7 mm diam., cavo, viridi-violaceo. Involucrum ad 23-phyllum phyllis crassis durisque, acutis, pungentibus, basi incrassatis, supra obscure violaceis, subtus viridibus, anguste triangulatis, margine paulo incrassatis, 20—25 mm longis et 4—5 mm latis. Capitulum magnum atroviolaceum depresso-hemisphaericum, 21—27 mm altum et 27—37 mm latum; receptaculum vaginis bractearum profunde alveolatum, intus cavum, caverna ad 17 mm lata et 13 mm alta, pariete 2 mm solum crasso. Bracteae anguste rectangulato-subspathulatae, firmae, subcarnosae, basi incrassatae albae, amplexiflorae, apice truncatae et obscure violaceae, margine angustissime albonotatae, ad 7—8 mm longae et basi 2—3 mm latae. Flores numerosissimi, jam deflorati solum visi, staminibus exceptis 7 mm longi. Sepala rectangulata, cochleata, apice truncata et ± emarginata, sat crassa, alboviridia apice obscure violacea, 3—3,5 mm longa et 1,5—2 mm lata. Petala ex albo violascentia, duplicato-inflexa, apice subdentata, 2—2,1 mm longa et 0,7 mm lata, mox decidua. Stamina violacea filamentis 5 mm longis apice incurvis, antheris ovatis 1,5 mm longis. Stylopodium crateriforme viride; styli 3—4 mm longi, atroviolacei. Mericarpium fuscum subnitidum 4—5 mm longum et 2,5 mm latum, ambitu truncato-ovale, late et obtuse carinatum, dorso laeve vel inconspicue tuberculatum, sub apice appendicibus calycinis sat magnis ornatum, margine anguste alatum nec non dentatum.

Masatierra: Portezuelo de Villagra, on the precipitous walls facing SW. and SE., c. 620 m, about a dozen specimens seen (past fl. $^{25}/_{12}$ 16, no. 196).

A very distinct and conspicuous species of the well known insular type of rosulate dwarf-trees; in spite of growing close to the most frequented spot

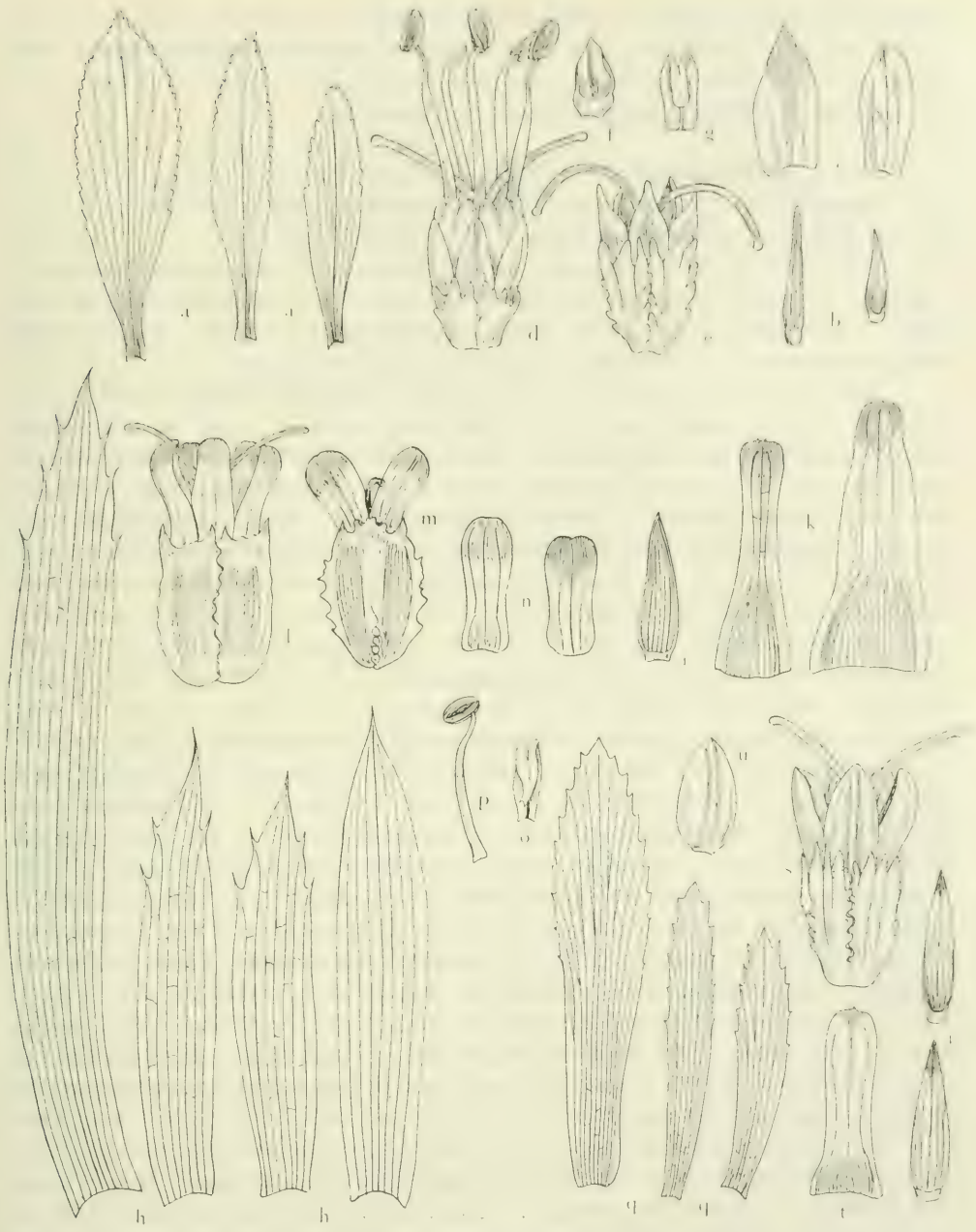


Fig. 21. **a**—**g** *Eryngium bupleuroides:* **a** leaves, ½ nat. size; **b** involucral leaves, outside and inside, nat. size; **c** bracts, outside and inside; **d** flower; **e** id. in fruit; **f** sepal (inside); **g** petal; c—g × 5. **h**—**p** *E. inaccessum:* **h** leaves, ½ nat. size; **i** involucral leaf (inside), nat. size; **k** bracts, inside and outside; **l** fruit, **m** mericarp from the back, **n** sepals, **o** petal, **p** stamen; k—p × 5. **q**—**u** *E. fernandezianum:* **q** leaves, ½ nat. size; **r** involucral leaves, inside and outside, nat size; **s** flower, **t** bract, **u** sepal; s—u × 5.

in the island it seems to have escaped the attention of all earlier visitors. The place where it was found is a perfectly perpendicular and thoroughly inaccessible

rock wall, and it cost us considerable trouble to obtain sufficient material. The photograph on Plate 12 is of a complete specimen that had been lowered down from the cliff.

Area of distribution: Endemic in Masatierra.

88. **E. fernandezianum** Skottsb. Stud. 17, Fig. 5. — Fig. 21 q—u.

Masatierra: Portezuelo de Villagra, c. 600 m, two specimens at the foot of the crest west of the pass (past fl. $^{24}/_{12}$ 16, no. 188).

Described from a fragment without flowers or fruit, collected by me in 1908, as far as I can understand taken from one of the two bushes seen in 1917. They bore flower heads, but petals and stamens were gone. No ripe fruits were encountered. A complete description is given below.

Arbuscula glaberrima 0,75 m saltem alta, erecta, pseudodichotome ramosa, ramis 5—10 mm crassis, junioribus creberrime annulatis. Folia ad apices ramorum confertissime rosulata, firma et crassiuscula, basi tenuiora subamplexicaulia, nervis perplurimis parallelis percursa, nervo centrali magis conspicuo et in pagina inferiore leviter incrassato, linearia, subspathulata, acuta, margine in parte dimidia vel tertia superiore serratodentata dentibus mitibus utroque latere 5—9 (plerumque 6 vel 7), 6—12,3 cm longa et 11—25 mm lata, basi 9—12 mm. Inflorescentia terminalis monocephala, scapo 5—6 cm longo et 3 mm crasso superne cavo. Involucrum circ. 18-phyllum phyllis longissime triangulatis acutis basi incrassatis, margine inferne scariosis, supra colore fuscoviridi in violaceum spectante, subtus viridibus, ad 20 mm longis et 5 mm latis. Capitulum circ. 17 mm altum et 20 latum, viridi-violascens. Receptaculum cavum caverna 6—9 mm alta et 8—12 mm diam. Bracteae lineari-subspathulatae, apice truncato-rotundatae, basi incrassatae, 5 mm longae et 1,5—2 latae, hyalino-albidae, apice violaceae. Flores confertissimi omnes jam deflorati, 6 mm longi et 3 mm diam. Sepala ovata, rotundato-acutata, margine scariosa, viridia, apice violascentia, 2,5—3 mm longa et 1,5—1,7 mm lata. Petala ... Stamina ... Stylopodium crateriforme obscure viride. Styli 4,5—5 mm longi virides. Mericarpium immaturum 3,5 mm longum, viride, sectione triangulare, apice circumcirca appendiculatum, dorso et margine appendiculis humilioribus ornatum.

I am strongly inclined to regard this as a bastard between *E. bupleuroides* and *E. inaccessum*. This idea did not occur to me when describing the species, as one of the supposed parents was unknown at that time. In most characters it is intermediate between the two. The cortex is more as in *E. inaccessum*, but the internodes sometimes slightly longer. The leaves are exactly intermediate in shape and size (see fig. 21), and so are the marginal teeth in shape and number; they are not pungent. The midrib is more conspicuous than in *E. inaccessum*, where all the principal veins are of the same strength, but less prominent than in *E. bupleuroides*. The scape and receptacle are hollow as in the former. The involucral leaves are intermediate in shape, size and number, being green in *E. bupleuroides*. The head stands between the two in shape and size and so do the sepals. The fruit is more like that in *E. bupleuroides*. No ripe seeds were found. In anatomical structure the fruit takes an intermediate position. Both the supposed parents grow close to the place where *E. fernandezianum* was found, and its great scarcity speaks rather in favour of

a hybrid origin. It is certainly one of the very rarest plants in the island. Still, no proofs that it is a bastard can be given at present.

The following figures illustrate the intermediate position:

	Number of teeth in leaves	Number of involucral leaves	Size of involucral leaves, mm	Size of bracts, mm	Size of sepals, mm	Length of style, mm
E. bupleuroides	8—18(10—11)	10—12	10—20×3	3,5—4×1,5—2	2—2,5×1—1,2	6
E. fernandezianum	5— 9 (6—7)	16—18	20×4—5	5×1,5—2	2,5—3 ×1,5—1,7	4,5—5
E. inaccessum	1— 4 (2—3)	18—23	20—25×4—5	7—8×2—3	3—3,5×1,5—2	3—4

Area of distribution: Endemic in Masatierra.

89. **E. sarcophyllum** Hook et Arn. — JOHOW, Estud. 101; SKOTTSBERG, Stud. 16, Fig. 4, Taf. 5 Fig. 5.

Masafuera: coast cliffs, very local: CUMING! JOHOW! — Between Varadero and Tierras Blancas (fr. $^{17}/_{2}$ 17, no. 402); Rodado del Sándalo.

Area of distribution: Endemic in Masafuera.

Apium L.

90. **A. fernandezianum** Joh.; JOHOW, Estud. 101; SKOTTSBERG, Stud. 17, Taf. 5 Fig. 6.

Masatierra: Tres Puntas (JOHOW); barren cliffs in B. del Padre (fr. $^{15}/_{1}$ 17, no. 291; beg. fl. $^{6}/_{8}$ 17, BÄCKSTRÖM no. 291 b; also observed by JOHOW and by the writer, 1908); Tierras Blancas (fl. $^{6}/_{8}$ 17, BÄCKSTRÖM no. 1219).

Cultivated in a temperate house this species develops exceedingly well and flowers and fruits freely. The branches, which are decumbent and root at the nodes, attain a length of one meter. The fruit is typical of the genus and agrees with that of *A. graveolens* in structure. *A. fernandezianum* is related to *A. prostratum* Labill., widely dispersed in the Southern Hemisphere; it differs above all in the shape and cutting of the leaves.

Area of distribution: Endemic in Masatierra.

Ericaceae.

Pernettya Gaud.

91. **P. rigida** (Bert.) DC. — JOHOW, Estud. 87.

Masatierra: Generally outside the forest but rare below the wooded region; one of the most important shrubs on the rocky ridges, where it forms low thickets. It does not, however, thrive well in the dry western section. We found it on all the ridges to the highest altitude reached (c. 800 m), and I am sure it is a leading species on the top of the Yunque. — Fl. $^{3}/_{12}$ 16, no. 27;

$^{8}/_{12}$ 16, no. 89; $^{4}/_{1}$ 17, no. 259; fr. $^{17}/_{4}$ 17, no. 623. — A form with larger and thinner leaves was collected at the edge of the *Dicksonia*-forest on C. Salsipuedes (buds $^{8}/_{12}$ 16, no. 77), another with exceptionally narrow leaves among rocks near this place (fl. $^{8}/_{12}$ 16, no. 86).

Masafuera: Scattered in the higher parts, locally abundant. Ridges and plains above the Chozas village, 600—1350 m (fl. $^{15}/_{2}$ 17, no. 490); slopes of Los Inocentes, 480—1400 m, not uncommon.

Area of distribution: Endemic.

Convolvulaceae.

Dichondra Forst.

*92. **D. repens** Forst.

Masatierra: Pto Frances, by the stream, c. 40 m.

Masafuera: Outer part of Q. de las Casas, among grass (fr. $^{27}/_{2}$ 17, no. 551).

New for Juan Fernandez. A rather typical *D. repens;* the young leaves are sericeous, the older sparingly pubescent below and glabrous above, the peduncles 2 cm long or even longer. Compare HALLIER in ENGLER's Jahrb. XVIII (1892) 83. REICHE, Fl. de Chile V. 173 includes all forms under *D. repens* Forst.

I suspect this to have been collected by BERTERO, for MONTAGNE, Prodr. Fl. Fern. 356 enumerates »Uredo Hydrocotyles Bert. Hab. ad folia Hydrocotyles?» No *Hydrocotyle* has ever been reported from the islands; sterile *Dichondra* may perhaps be mistaken for a species of that genus.

Area of distribution: Subcosmopolitan (Eastern Asia, India, Africa, Mascarene Islands, Australia, New Zealand, North and Central America, South America to Patagonia and Chile, Juan Fernandez).

Calystegia R. Br.

93. **C. tuguriorum** R. Br. — Syn. *C. Hantelmanni* Phil., JOHOW, Estud. 85.

Masafuera: Q. de las Casas (no. 412, also observed by JOHOW); Q. de las Vacas, abundant in the outer part; Q. del Varadero. Forming dense carpets on the canyon walls.

Both J. D. HOOKER and HEMSLEY united *C. Hantelmanni* with *C. tuguriorum,* but JOHOW kept them separate, declaring that the latter is a small herb, not attaining the size of *C. sepium.* However, CHEESEMAN, Man. N. Z. Flora 476 states that the stem is slender, prostrate *or* climbing, often clothing trees and shrubs to a considerable height. During his monographical studies HALLIER came to the conclusion that the two species are identical [ENGLER's Jahrb. XVI (1893) 548], and I have found it better to follow him.

Area of distribution: New Zealand; Chatham Islands; South Chile (Valdivia); Masafuera.

Boraginaceae.

Selkirkia Hemsl.

94. **S. Berterii** (Colla) Hemsl. — JOHOW, Estud. 85.

Masatierra: On the steep rocky slopes above the forests in the centre of the island, rare. Co Damajuana, 500—550 m, very rare; the gap between Damajuana and Co Yunque, 580 m, few specimens (past fl. $^{18}/_{12}$ 16, no. 132); northwest face of Co Pirámide, narrow rock ledge, c. 600 m, few shrubs; Portezuelo de Villagra, near the pass (also observed by JOHOW), a couple of specimens, 570 m; Q. del Monte Maderugo, rock wall 390 m, rare (past fl. $^{24}/_{1}$ 17, no. 341).

Area of distribution: Endemic in Masatierra; monotypic.

Verbenaceae.

Rhaphithamnus Miers.

95. **Rh. venustus** (Phil.) Skottsb. — Syn. *Citharexylon venustum* Phil. Anal. Univ. 1856; *Rh. longiflorus* Miers, Trans. Linn. Soc. XXVII (1870) 98; JOHOW, Estud. 78.

Masatierra: in the wooded region, extending from Pto Frances to the south slope of Co Chumacera, hardly ever seen below 200 m and much more common higher up; also in the shrubberies on the ridges. Fl. $^{3}/_{12}$ 16, no. 11; $^{7}/_{12}$ 16, no. 40; $^{28}/_{12}$ 16, no. 198; fr. $^{21}/_{4}$ 17, no. 625, $^{24}/_{4}$ 17, no. 11 b. — A form with red flowers was found near Plazoleta del Yunque, c. 250 m.

Masafuera: GUAJARDO without locality. — In the forests, much more scarce than in Masatierra; on the Sanchez plain, 515 m; Q. del Mono, 475 m; Q. del Blindado, 440 m (fl.-fr. $^{19}/_{2}$ 17, no. 516).

Area of distribution: Endemic.

Labiatae.

Cuminia Colla.

While HEMSLEY, Challenger Report 51 lists three species, *eriantha, fernandezia* and *brevidens,* JOHOW reduces *brevidens* to *fernandezia.* I have seen the material on which *C. brevidens* was based by BENTHAM, and I think that JOHOW is right. The length of the calyx lobes is submitted to some variation; I admit that they are very short in *C. brevidens,* but otherwise no perceptible difference is found.

HEMSLEY ascribed unisexual flowers to *Cuminia,* JOHOW denied the correctness of this statement and suggested that HEMSLEY was misled by the pronounced dichogamy of the flowers. My examination of numerous living

specimens shows that there are two kinds of flowers, differing in size and in development of the anthers. Female flowers have shorter corolla, exserted style and small staminodes, bisexual flowers have a larger corolla, included style and normal stamens. I believe there are specimens with one kind only, but others exhibit both kinds in the same inflorescence. Flowers with perfect anthers were called male by HEMSLEY. There does not, however, seem to be any difference in the style or stigma between them and the female flowers. Still I have observed cases where the former were shed soon after they had opened. In a few cases female flowers with one or two fertile stamens were met with.

JOHOW's statement that Cuminia absolutely lacks »esencias etéreas» is not in accordance with my experience, for *C. eriantha* at least, has a weak but unmistakable labiatoid smell.

96. **C. fernandezia** Colla. — JOHOW, Estud. 81. — Fig. 22.

Masatierra: In the open forests of the ridges and along the rocky crests, never abundant and only once observed below 300 m. — Between Q. de la

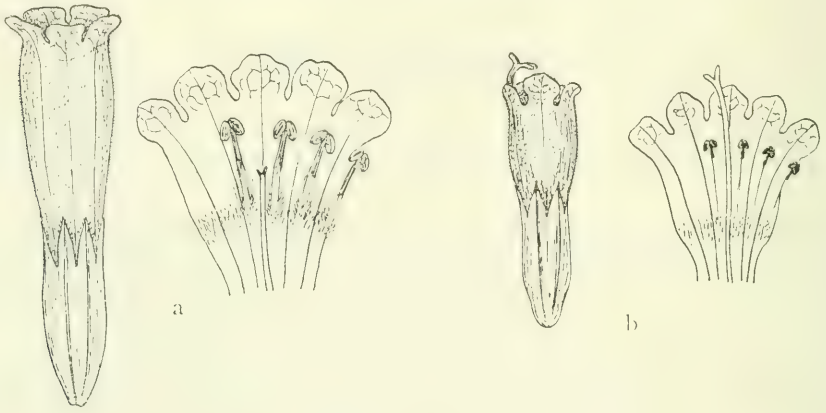


Fig. 22. *Cuminia fernandezia:* **a** male or bisexual, **b** female flower, with limbs slit open to show stamens and staminodes. × 4.

Piedra Agujereada and Q. Laura (f. magis pilosa); in the higher parts of El Rabanal (also quoted by JOHOW; fl. $^{28}/_{3}$ 17, no. 576, f. magis pilosa); slopes of Co Damajuana, 350—530 m; V. Colonial, C. Central (fl. $^{18}/_{1}$ 17, no. 307); Portezuelo de Villagra (also observed by JOHOW), 540—590 m, scarce (beg. fl. $^{25}/_{12}$ 16, no. 192, fr. $^{31}/_{3}$ 17, no. 192 b); Q. del Monte Maderugo, rocky ridge, 390—500 m; C. Salsipuedes (also observed by JOHOW) 400—625 m, not uncommon (beg. fl. $^{20}/_{12}$ 16, no. 165); Pto Ingles, central ridge, 570 m; between La Vaquería and Q. Juanango, c. 300 m; ridge west of Co Yunque, c. 550 m; low hill near the camping place in B. Villagra, c. 200 m (fl. $^{7}/_{1}$ 17, no. 234); Co Chumacera, south slope (fl. $^{6}/_{1}$ 17, no. 356).

	Length in mm of			
	calyx	corolla	anthers	style
♂	6	12	1	7—9
♀	4,5	7—7,5	0,3	7,5—8

Generally perfectly glabrous save for the corolla and some hairs on the calyx lobes. The young leaves are, however, more or less pubescent. No. 576 differs from ordinary *fernandezia* in the persistent indumentum on petiole, nerves and pedicels, a character otherwise attributed to *eriantha* only. This species has larger and broader leaves of a more dull green colour, light violet to nearly white corolla with almost white lobes and filaments, while the flowers of *fernandezia* are of a bright blue lilac colour.

Area of distribution: Endemic in Masatierra; the genus is endemic.

97. **C. eriantha** Benth. — JOHOW, Estud. 82.

Masatierra: with the former, but much more scarce. Between Q. de la Piedra Agujereada and Q. Laura, c. 500; El Rabanal (JOHOW); V. Colonial, C. Central, c. 500 m; Portezuelo, on the Villagra side in forest (also observed by JOHOW), c. 500 m, rare (fl. $^{10}/_{1}$ 17, no. 278); C. Salsipuedes (also JOHOW), in *Dicksonia*-grove, 660 m, rare (fl. $^{13}/_{1}$ 17, no. 282).

	Length in mm of			
	calyx	corolla	anthers	style
♂	7	12—13	0,75	7—9
♀	5	8—9	0,3	7—8,5

Area of distribution: Endemic in Masatierra.

Solanaceae.

Solanum L.

98. **S. fernandezianum** Phil. — JOHOW, Estud. 82.

Masatierra: BERTERO! GERMAIN! — In the wooded region, in moist humus, very local. Pto Frances (JOHOW); C. Chifladores, near the Frances Valley; El Rabanal, in the valley; Northeast slope of Co Damajuana, c. 500 m; V. Colonial, Q. del Monte Maderugo, 235 m (fl.-unr. fr. $^{24}/_{1}$ 17, no. 340); forest on the east slope of C. Salsipuedes, c. 350 m; Pto Ingles (also quoted by JOHOW), central ridge, 470 m; Q. Villagra, near the road just below the pass, c. 550 m (fl. $^{3}/_{12}$, $^{24}/_{12}$ 16, no. 12, fr. April 1917; beg. fl. $^{31}/_{7}$ 17, BÄCKSTRÖM no. 12 b).

The species was described as lacking tubers, but on BERTERO's label is written »tubercula gustu amaro». This is very puzzling, for JOHOW could not find the tubers, nor were we able to discover any. In order to find out if they develop during the winter, I told Mr. BÄCKSTRÖM to dig for them, but he could not find them. I have raised several specimens from seeds; they have flowered and fruited, but behave like annuals and do not form any tubers. I have propagated them from cuttings, using the basal axillary shoots. In a wild state the plant branches profusely and seems to be perennial.

Area of distribution: Endemic in Masatierra.

99. **S. Robinsonianum** Bitter in FEDDE's Repert. XI (1912), 7. — Syn. *S. furcatum,* JOHOW, Estud. 83.

Masatierra: PHILIPPI 1864! — El Rabanal (JOHOW); Pto Ingles, west branch, 190 m (fl.-fr. $^{20}/_{1}$ 17, no. 311); B. Villagra, ravine near the camping-place, c. 180 m (fl.-fr. $^{7}/_{1}$ 17, no. 260).

Santa Clara: JOHOW. — Morro de los Alelíes, rare (fl.-fr. $^{26}/_{1}$ 17, no. 343).

***Masafuera:** near the Chozas village (fl. $^{12}/_{2}$ 17, no. 506); Q. del Varadero (fl.-fr. $^{12}/_{3}$ 17, no. 508). — New for this island.

Professor BITTER kindly examined my dried material as well as living plants raised from my seeds and communicates the following new description:

»Addenda ad descriptionem:

Herbaceum, rectum, ca. 40—60 cm altum, divaricatim ramosum; rami ca. 4 mm diam., obtuse angulati, lineis decurrentibus parum prominentibus instructi, pilis simplicibus pluricellularibus acutis curvatim accumbentibus primo crebris serius sparsioribus obsiti; internodia in ramis florentibus 5—8 cm longa; folia superiora false geminata, inaequalia; petioli 1,5—2 cm longi, jam a basi vel fere a medio sensim latius alati; laminae ovatae vel late ovati-lanceolatae, majores 8,5 : 5,9—9,5 : 5,5-6 usque ad 14 : 8,5 cm, minores 5 : 3, 6 : 3,7, 7 : 4,7, 5 : 4,5 cm, basi late cuneatim vel subrotundatim in petiolum alatum abeuntes, infra medium latissimae, ad apicem versus magis sensim angustatae, subacutae vel obtusiusculae, dentibus grossis late triangularibus in utroque latere ca. 5—7 obtusis vel obtusissimis instructae, membranaceae, utrinque virides, subtus vix pallidiores nitidioresque, utrinque praecipue in venis, sparsius in mesophyllo pilis simplicibus acutis pluricellularibus curvatim accumbentibus crebris obsitae; vena media et venae later. prim. in utroque latere 7—8 (raro 9—11) curvatim ascendentes subtus prominentes; inflorescentiae laterales, a foliis remotae, 7—11-florae; pedunculus 12—25 mm (tandem — 27 mm), longus, semel furcatus; rhachides cr. 6—(tandem)9 mm longae, flores plerumque densiuscule in rhachidum apicibus secuti; pedicelli 5—11 mm longi, in statu florifero erecti; calyx campanulatus, cr. 4 : 3 mm, profunde in lobos lineari-lanceolatos acutos inaequilongos (exteriore ceteris longiore) 2—3 : 0,8 mm partitus, extus sicut pedunculus, rhachides et pedicelli pilis brevibus simplicibus pluricellularibus acutis accumbentibus praeditus, intus praecipue in parte connata glandulis minutis breviter stipitatis crebris obsitus; corolla stellata, diam. 15—17 mm, extus violacei-suffusa, ceterum albida, in parte interiore stella flavescente striis tenuibus obscuris (fusci-violaceis) radiantibus insignata, profunde in lobos lanceolatos acutos 8 : 2,5 mm extus pilis simplicibus acutis brevibus crebris obsitos intus pilis brevibus similibus in vena media tantum sparsis, in parte apicali crebris praeditos partita; filamenta paulum inaequilonga, 1,5—2 mm longa, gracilia, intus pilis pluricellularibus simplicibus vel rarius semel ramosis acutis densis instructa; antherae anguste ellipsoideae, 3 : 0,8 mm, utrinque emarginatae, poris introrsis subapicalibus obliquis; ovarium subglobosum, 1 mm diam., glabrum; stylus stamina manifeste superans, 6 mm longus, fere a basi cr. $^{2}/_{3}$ longitudinis pilis densis simplicibus pluricellularibus acutis sensim minoribus patentibus obsitus; stigma styli apice paulum crassius, obtusum, subbilobum; calyx in statu fructifero auctus, diam. 7—8 mm, lobis latius lanceolatis cr. 3—4 : 2 mm subacutis vel obtusiusculis baccae accumbentibus; baccae maturae globosae, non satis magnae, ca. 5—8 mm diam., parum nitidae, tandem nigerrimae, succo intense purpurei-violaceo impletae; granula

sclerotica duo subapicalia subglobosa parva, ca. 0,6 mm diam.; semina ca. 15—16, oblique reniformia, valde applanata, 1,6—1,8 : 1—1,3 : 0,5 mm, manifeste minute reticulata, in baccis maturis extus succo violaceo intense tincta.»

Area of distribution: Endemic.

*100. **S.** *(Morella)* **masafueranum** Bitter et Skottsb. nov. spec. — Plate 14.

The following description was written by Professor BITTER.

Herbaceum, ad 1,75 m altum; rami robusti, ± ve flexuosi, 4—6 mm diam., subteretes vel paulum obtuse angulati, lineis decurrentibus parum prominentibus instructi, pilis simplicibus pluricellularibus acutis parvis diaphanis curvatim accumbentibus plerumque sparsis obsiti, tandem subglabrescentes; internodia in ramis majoribus elongatioribus 9—14 cm longa; folia solitaria vel superiora saepe false geminata, tunc inaequalia; petioli 1,5—4 cm longi, ad laminam versus sensim magis alati, pilis simplicibus pluricellularibus acutis parvis crebris obsiti; laminae late oblique lanceolatae vel oblongi-lanceolatae, infra medium latissimae, basi oblique cuneatim vel rotundatim in petiolum alatum abeuntes, ad apicem versus magis sensim angustatae, acutae vel fere sensim acuminatae, integrae, majores cr. 12 : 5, 15 : 6 usque ad 17,5 : 7 cm (an etiam majores?), minores 9 : 3,3 usque ad 12 : 4,5 cm, laminae omnes herbaceae, utrinque sordide virides, subtus paulum pallidiores nitidioresque, utrinque in venis et in mesophyllo pilis simplicibus pluricellularibus acutis sparsis, in margine paulo densioribus obsitae; vena media, venae later. prim. 6 curvatim ascendentes et venae later. secund. illas reticulatim conjungentes albide flavescentes subtus prominentes; venae majores subtus sicut petioli et rami in statu sicco striolis brevissimis parum prominentibus densis praeditae (cellulae arena crystallina impletae!); inflorescentiae laterales, extraaxillares, fere semper paulum infra nodos ortae, simplices vel semel breviter furcatae, 5—8-florae; pedunculus 1,5—(tandem in statu fructifero!)3 cm longus, rhachides 4—6 mm tantum longae, floribus ergo densiuscule secutis; pedicelli in statu florifero erecti, 6 mm longi, in statu fructifero basi deflexi, 10—11 mm longi; calyx campanulatus, 3 mm longus, apice fere 3 mm diam., in dentes 5 ovati-lanceolatos obtusiusculos 1 mm longos 0,5 mm latos basi membranis diaphanis conjunctos partitus, extus sicut pedunculus, rhachis et pedicelli pilis paucicellularibus acutis curvatim accumbentibus densiusculis obtectus, intus glandulis minutis breviter stipitatis crebris obsitus; corolla alba, stellata, diam. 10—14 mm, in lobos 5 lanceolatos acutiusculos cr. 5 : 3 mm extus pilis simplicibus paucicellularibus acutis accumbentibus crebris in parte apicali densis et partim subramosis obtectos, intus in venae mediae parte superiore et in mesophylli parte apicali pilis simplicibus paucicellularibus obsitos partita; corollae tubus infra staminum insertiones cr. 1,5 mm longus, glaber; filamenta 1,5—(tandem)2 mm longa, intus (praecipue prope basim) pilis simplicibus pluricellularibus acutis densis ad apicem versus sensim sparsioribus praedita; antherae flavescentes, ellipsoideae, utrinque emarginatae, cr. 2,2 : 0,8—1 mm, poris introrsis apicalibus obliquis tandem paulum longitudinaliter dehiscentibus; ovarium subglobosum, 1 mm diam., glabrum; stylus 5,5—6 mm longus, in parte apicali subgeniculatim incurvatus, paulo supra basim glabram cr. $^2/_3$ longitudinis pilis tenuibus patentibus fere omnibus simplicibus (perpaucis semel subramosis) pluricellularibus acutis densis sensim minoribus obtectus, in parte apicali glaber;

stigma subglobosum, styli apice manifeste crassius; calyces fructiferi parum aucti, diam. cr. 5 mm, lobis magis triangularibus baccae submaturae accumbentibus; baccae submaturae globosae, 6—8 mm diam.; semina oblique reniformia, valde applanata, 2 : 1,5 : 0,5 mm, minute reticulata; granula sclerotica in bacca non reperi.

Masafuera: In forests. On the Sanchez plain, 515 m (fl. $^{25}/_{2}$ 17, no. 526); near the Chozas village (fl.-unr. fr. $^{3}/_{3}$ 17, no. 363).

Area of distribution: Endemic in Masafuera.

Nicotiana L.

101. **N. cordifolia** Phil. — JOHOW, Est. 83; SKOTTSBERG, Stud. 7, Taf. 6 Fig. 4.

Masafuera: Coast cliffs close to the landing place near Q. de las Casas (fl. $^{10}/_{2}$ 17, no. 1220); Q. de las Vacas, on the canyon wall, not far from the entrance, scattered specimens (also observed by JOHOW and by the writer in 1908, only locality known hitherto; fl.-fr. $^{10}/_{2}$ 17, no. 392); Q. Angosta, in the gorge; Q. del Varadero, numerous fine shrubs near the entrance; along the shore of Tierras Blancas, not uncommon (fl.-fr. $^{17}/_{2}$ 17, no. 399).

Area of distribution: Endemic in Masafuera.

Scrophulariaceae.

Mimulus L.

102. **M. parviflorus** Lindl. — JOHOW, Estud. 82.

var. **externa** nov. var. — A plantis in Chile lectis differt foliis omnibus petiolatis (superioribus brevius sed semper distincte), margine sat grosse et irregulariter serratis, nec non pedunculis petiolum aequantibus sed foliis multum brevioribus. Planta perennis pilosa.

Masafuera: GERMAIN! — Q. de las Casas (also observed by JOHOW), wet places under overhanging rocks etc.; Q. de las Vacas (fr. $^{13}/_{2}$ 17, no. 497); Q. Angosta, at the waterfall; Q. de la Lobería (fl.-fr. $^{17}/_{2}$ 17, no. 486).

It is hardly possible to ascertain the right position of the insular form unless all the material from the continent is revised. GERMAIN's specimens were labelled *M. parviflorus var.* by PHILIPPI, and JOHOW remarks that the Masafueran plant differs from the continental one in the short pedicels and in the pubescence. As all specimens collected in Masafuera are of the same kind, while there is no similar form in the collections from Chile, I have described the former as a variety. It is not impossible that *M. pilosiusculus* Kunth from Perú is the same, but as I have not seen authentic material and the description is very brief, I must leave this question open.

Area of distribution: *M. parviflorus* is common in central and south Chile.

Euphrasia L.

*103. **E. formosissima** nov. spec. — Plate 15, fig. 1, Plate 20, fig. 6—7; text fig. 23.

Eueuphrasia pluriennis lignosa, plerumque 15—20, interdum usque ad 70 cm alta, ad radices *Pernettyae rigidae* parasitica. Truncus primarius cylindrico-tetragonus, ad 6 mm crassus, cortice obscure fusco inferne glabrato, fere a basi opposite ramosus, ramis ramulosis ramulis iterum ramosis, junioribus distinctius tetragonis bifariam hirsutis, pilis crassis plerumque bicellularibus. Folia carnosula late — anguste ovata, 8—18 (rarius ad 20 et ultra) mm longa et 5—8 mm lata, basi in petiolum 2—3 mm longum subiter vel sensim angustata, margine leviter revoluta dentibus humilibus latissime truncatis utrinque 3—5 (plerumque 4) instructa, supra subglabra, parcissime glandulosa sed secus nervos pilosiuscula, subtus in parte inferiore ad nervos parce pilosa vel subglabra, infra marginem et inter nervos incrassatos reticulo glandularum humilium capite ferrugineo pulchre notata. Bracteae quam folia caulina minores ac latiores. Flores ad apicem caulis ramorumque breviter sed densiuscule spicati, sessiles. Calyx pro genere sat typicus, lobis lineari-subspathulatis apice incrassatis, extus nervis exceptis subglaber, intus secus nervos pilosus pilis unicellularibus et glandulis ferrugineis commixtis, 5—6 mm longus, profunde partitus. Corolla alba 10—13 mm longa, tubo 4—5 mm longo ad finem anthesis haud elongato, subglabro, intus inferne obscure luteo; labium superius extus pilosum, 6—7 mm longum et 5—6 latum, bifidum lobulis reflexis; labium inferius glabrum 7—8 mm longum et ad 10—11 mm latum, in centro macula magna flavo-aurantiaca distincte circumscripta notatum. Filamenta staminum posticorum sub 3 mm, anticorum circ. 3,5 mm longa, inferne lutea, dein viridescentia, antherae ad 1,4 mm longae, ferrugineae, subglabrae-glabrae, duorum staminum posticorum loculus unus paulo longius calcaratus. Stylus ad 9 mm longus, dilute viridis, parce pilosus, exsertus; stigma alboviride capitatum. Capsula matura valvis obovatis minute emarginatis et abrupte apiculatis, superne setulosa, 2,8—3 mm longa et 2—2,1 mm lata. Semina oblique fusiformia 1—1,1 mm longa straminea, testa longitudinaliter sulcata et inter juga transverse sculpta.

Masafuera: in the higher parts, not uncommon in the alpine region. Ridges above Q. Sanchez (fl. $^{25}/_{2}$ 17, no. 386 b); north of the Casas gorge from 800 to 1400 m (fl.-fr. $^{14}/_{2}$—$^{7}/_{3}$ 17, no. 386); C. Atravesado, common; C. del Barril, from 750 m (fl. $^{1}/_{3}$ 17, no. 547).

A rather interesting discovery. Two types of *Euphrasia* are known from the southern hemisphere, sect. *Trifidae* from Chile and sect. *Eueuphrasia* subsect. *Australes* from Australia and New Zealand. The new species has nothing to do with the South American species, and as far as I can see, it is not nearly related to the Australes, but belongs to the *Semicalcaratae,* known before only from the northern hemisphere. Within this section *E. formosissima* is the only perennial species. Among boreal ones it might be compared with *E. grandiflora* Hochst. (Azores), or with species from Eastern Asia. It lies near at hand to regard it as one of the older endemics in the islands, as it differs

from all other species in its mode of growth (see below) and as it stands so far apart from all the congeners on the south hemisphere.

The arrangement of the glands on the lower leaf surface is illustrated in fig. 23 b. These glands are of two kinds, smaller with a short, narrow, unicellular stalk and a globose two-celled head with dark brown contents and larger (much less numerous), sessile, like a semiglobose papilla, divided by a radial wall and with yellowish contents. Both kinds were described by WETTSTEIN in his monograph of the genus, p. 18—19. The long pedicellate glands so common in many other species seem to be wanting. The smaller kind also occurs on the upper side of the leaf and on the calyx.

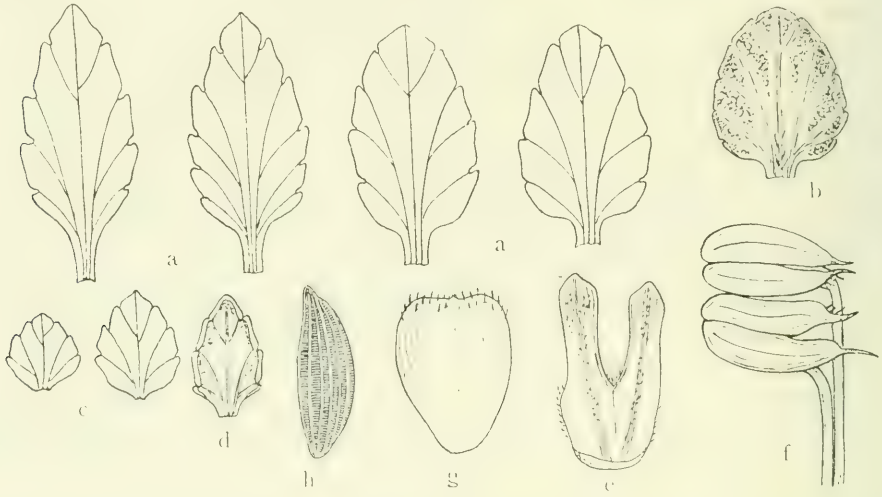


Fig. 23. *Euphrasia formosissima:* **a** leaves, showing general outline, **b** lower side of leaf, **c** bracts, **d** lower side of bract, a—d × 2; **e** two calyx lobes, inside, × 4; **f** stamens, × 12 ½; **g** capsule, × 6,6; **h** seed, × 20.

The growth of other perennial *Euphrasiae* was explained by WETTSTEIN l. c. 14. The shoots die off after having produced flowers, while lateral branches, which are sterile the first season, become floriferous the next year, and so forth. *E. formosissima* represents another type. To some extent it is like many others, for the primary stem and a number of side branches may produce flowers simultaneously, sometimes even a few shoots of a third generation flower at the same time. It occurs that a branch dies after having flowered, but very often this is not the case: the branch survives, the top continues to grow above the floral region and produces a new set of flowers, and this may be repeated again; thus, the new species differs from all others. If, as WETTSTEIN thinks, the perennial species are genetically older than the annual, *E. formosissima* seems to exhibit the most primitive type of *Euphrasia* known.

Area of distribution: Endemic in Masafuera.

Plantaginaceae.

Plantago L.

104. **P. fernandezia** Bert. — JOHOW, Estud. 77.

Masatierra: In the shrubberies along the high ridges in the centre of the island, rare. North face of Co Damajuana, 530 m, few specimens; the depression between this peak and Co Yunque, 580 m, rare; V. Colonial, C. Central, 570 m, very few plants; Portezuelo de Villagra, c. 550 m, near the path in two places, perhaps twenty specimens altogether (fl. $^{3-25}/_{12}$ 16, no. 7; only locality known before, JOHOW etc.) rock ledges on the perpendicular wall of Co Pirámide, c. 575 m.

Professor PILGER sent me the following notes on this species:

»P. fernandezia ist mit P. princeps Cham. et Schlecht. von den Hawaii-Inseln verwandt: sie ist dieser Art nicht nur habituell ähnlich, sondern zeigt auch grosse Übereinstimmung im Blütenbau. Für eine entferntere Verwandtschaft könnten auf dem amerikanischen Festland höchstens einige Arten der Cleistantha-Gruppe (P. Candollei, oreades, Sodiroana) in Betracht kommen.

Zwei Blütenstände der Exemplare von P. fernandezia zeigen eine mehr oder weniger weitgehende Verkümmerung der Staubblätter. Die normale Form hat Blüten mit lang herausragenden Antheren. Zu dieser Form sind Übergänge vorhanden, indem die Antheren etwas zwischen den dauernd aufrechten Corollenzipfeln sich hervordrängen und ± reichlich Pollen entwickeln. In anderen Blüten bleiben die Antheren von den aufrechten Zipfeln umschlossen, sie sind ziemlich gross, entwickeln aber keinen Pollen. Der Griffel ragt aus der Blüte hervor. Man könnte an einen Vergleich mit dem Dimorphismus bei der Cleistantha-Gruppe denken, doch ist der Fruchtknoten in den Blüten mit reduzierten Staubblättern nicht stark entwickelt wie dort bei den geschlossenen Blüten, sondern bleibt klein und von der Röhre frei.«

Area of distribution: Endemic in Masatierra.

105. **P. truncata** Cham. subsp. **Skottsbergii** Pilger. — *P. Skottsbergii* Pilger in SKOTTSBERG, Stud. 6.

Masatierra: B. del Padre (SKOTTSBERG 1908).

***Santa Clara:** scattered on the table-land (fr. $^{26}/_{1}$ 17, no. 350).

Professor PILGER remarks to this species: »P. Skottsbergii ist eine charakteristische Form, die allerdings der P. truncata subsp. firma sehr nahe steht. Am besten wird man sie neben P. firma auch als subspecies zu P. truncata stellen».

Area of distribution: *P. truncata* is known from Central and South Chile, the subspecies is endemic in Masatierra and Santa Clara.

Rubiaceae.

Oldenlandia L.

*106. **O. thesiifolia** K. Schum. — Syn. *O. uniflora* Ruiz. et Pav. *non* L.

Masatierra: V. Colonial, in the small stream at the foot of the chapel hill.

Rather like SCHUMANN's illustration in Flora Brasil. VI: 6, tab. 127. Agrees very well with specimens from Chile. Glabrous with few hairs on the ovary.

Undoubtedly of recent introduction, as it has not been recorded by previous visitors in spite of growing in Cumberland Bay. There is perhaps no reason to regard it as introduced with the human traffic; the valley is sometimes visited by stray birds from the continent, and they very likely brought seeds of this and some other species in mud adhering to their feet.

Area of distribution: Brazil, Argentina, Paraguay, Uruguay, Chile from Valparaiso to Chiloé, Masatierra.

Nertera Banks et Sol.

107. **N. depressa** Banks et Sol. — SKOTTSBERG, Stud. 6.

Masafuera: almost confined to the subalpine and alpine districts, where it occurs in moist places, round large stones, in small depressions in the ground etc., generally associated with mosses. — Q. de las Casas, in wet moss at the waterfall, 215 m; high land north of Casas, not uncommon from 750 to about 1100 m (fr. $^{12}/_{2}$ 17, no. 413, $^{25}/_{2}$ 17, no. 413 c); among rocks at Las Torres, 1370 m (fl.-fr. no. 413 b); C. del Barril, 650—750 m.

Area of distribution: Mexico to Fuegia; subantarctic—circumpolar; Hawaii; Masafuera.

Coprosma Forst.

108. **C. triflorum** (Hook. et Arn.) Benth. et Hook. f. — JOHOW, Est. 73. — Fig. 24 a—c.

Masatierra: in the open forest and in the shrubberies along the ridges, not uncommon from 3—400 m, ascending to the highest peaks and ranging from Pto Frances to Co Chumacera. Fl. ♂ $^{14}/_{12}$ 16, no. 26, $^{17}/_{12}$ 16, no. 150; fl. ♀ $^{17}/_{12}$ 16, no. 151 (a few fruits from 1916 still on the trees); past fl. ♀ $^{4}/_{1}$ 17, no. 235; fr. $^{28}/_{3}$ 17, no. 570, $^{11}/_{4}$ 17, no. 611.

Mistaken for *Hippotis triflora* Ruiz. et Pav. by BERTERO, Ann. sc. nat. XXI. 347; called *Psychotria? triflora* Hook. et Arn., Bot. Misc. III. 359, *P. Hookeri* G. Don Gen. Syst. Gard. III. 585. The flowers have not been described, but BENTHAM and HOOKER FIL. recognized it as a member of the genus *Coprosma*, Gen. plant. II. 139.

Generally strictly dioecious. Corolla of ♂ 6—7 mm long, fleshy, greenish brown, as a rule 4-cleft; 4 stamens with thin filaments, 6—7 mm long, anthers 4,5—5 mm with thick, brown connective. Female flowers with 2,5 mm long ovary; corolla dark lilac brown with narrow tube measuring 2—3 mm and four strongly revolute narrow linear segments, 2—2,5 mm long. Styles white, 9 mm long.

In one case a number of bisexual flowers were found on a branch of a female tree. They have a large, normal ovary with the usual long styles. The corolla is more as in the male flower, but only 4—5 mm long; there are 4 stamens with 2,5 mm long anthers but very short filaments. The pollen contained numerous sterile grains.

Very like *C. foliosum* A. Gray from Oahu (Hawaii), which differs in the narrower leaves and in the shape of corolla and stamens.

Area of distribution: Endemic in Masatierra.

109. **C. pyrifolium** (Hook. et Arn.) Skottsb. — Syn. *Psychotria pyrifolia* Hook. et Arn., JOHOW, Estud. 74. — Fig. 24 d.

Masatierra: An important forest tree, extending over the entire wooded region from Pto Frances to Co Chumacera and ranging from 200 m, or perhaps less, to 650 m at least. We did not find flowering specimens (sterile, $^{18}/_{12}$ 16, no. 161, $^{20}/_{12}$ 16, no. 1222, $^{18}/_{1}$ 17, no. 308); but ripe fruits were gathered $^{9}/_{4}$ 17, no. 600.

Masafuera: Scattered through the forested region; lowest altitude observed 280 m (fr. $^{17}/_{2}$ 17, no. 435); not uncommon up to 950 m. One small tree was

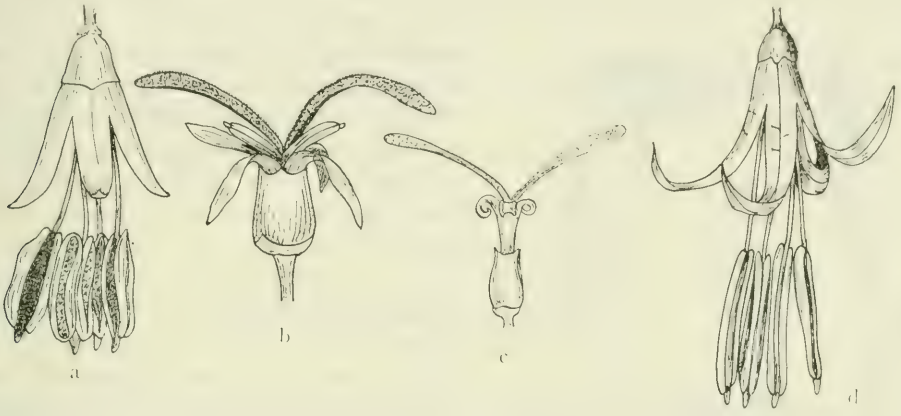


Fig. 24. **a—c** *Coprosma triflorum*, **a** male, **b** apparently bisexual, **c** female flower; **d** *C. pyrifolium*, male flower. All × 3.

found in the alpine fern-beds, c. 1200 m, not far from the Correspondencia Camp (fl. ♂ $^{5}/_{3}$ 17, no. 501); also in some of the deep gorges, by the stream, not much above sea level, f. i. in Q. de las Casas (past fl. ♀ $^{11}/_{2}$ 17, no. 499). — Specimens from open and sunny stations (nos. 499 and 501) differ from others by the firmer, bright green leaves.

The removal of *Psychotria pyrifolia* to *Coprosma* is quite welcome from a geographical point of view. BERTERO l. c. suggested that it was a mere form of his *Hippotis;* HOOKER and ARNOTT, l. c. 360, called it *Psychotria?,* while HEMSLEY and JOHOW dropped the question mark. It is dioecious and the structure of the flower is the same as in *C. triflorum;* accordingly, it differs widely from *Psychotria.* The male flower has not been described before; it is brownish green with yellow anthers. The corolla measures 8—9 mm and is deeply cleft with linear, acute, reflexed lobes; the stamens are inserted at the base of the corolla tube; the filaments measure 8—9, the anthers 5—6 mm.

C. pyrifolium, sometimes rather like the preceding, is a much larger tree with thinner and broader, more pyriform leaves, indistinctly serrulate in the upper half and with narrower meshes in the net of venules. As was pointed

out by JOHOW, it is also distinguished by the presence of domatia on the leaves. It also differs in the somewhat larger and more obovoid fruit as well as in the shape of the male flower, as seen from my figures.

C. pyrifolium is related to *C. laevigatum* Cheesem. from Rarotonga and to other species from the same region, and probably more nearly allied to these than to its congener in Masatierra.

Area of distribution: Endemic.

Galium L.

*110. **G. masafueranum** nov. spec. — Fig. 25.

Perenne, sat pusillum, ± decumbens. Radix primaria tenuis persistens, multiceps. Caules numerosi, tenuissimi, fragiles, inferne ramosi, repentes, ad nodos radicantes, saltem ad 2 dm longi, manifeste 4-lineati et secus lineas dense patente-retrorse setoso-hispidi. Folia quaternaria, subsessilia vel brevissime petiolata, elliptica, plerumque manifeste mucronata sed non pungentia, secus marginem revolutum nec non in nervo mediano subtus longe setosa, ceterum pilis nonnullis inspersa vel subglabra, 4—9 mm longa et 2—5 mm lata (plerumque 6 × 4 mm), inferiora jam emarcida conspicue minora. Inflorescentiae laterales breves foliis subaequilongae – duplo longiores; pedunculus setosus, ± curvatus, denique apice recurvus, ad 13 mm longus, apice 2—4-foliatus, plerumque 1—3-florus, floribus brevissime pedicellatis. Calyx nullus. Corolla luteoviridis, 2,5—3 mm diam., lobis mucronulatis 1,2—1,3 mm longis et 0,8—0,9 latis quattuor rarissime quinque, passim setosis. Stamina 0,5 mm longa. Stylus fere ad basin bifidus, ad 0,6 mm longus. Discus viridis incrassatus. Ovarium longe hispidum. Fructus 2,5 mm latus et 2 mm altus, cum setis ad 3,5 × 3 mm metiens. Mericarpia reniformia, dense setoso-hispida, setis rectis vel paulo curvatis nunquam uncinatis; superne interdum appendicibus longiusculis (ad 2 mm) apice nudis ceterum setosis instructa.

Fig. 25. *Galium masafueranum:* **a** branch, nat. size; **b** lower side of leaf, × 2½; **c** inflorescence and **d** flowers, × 5; **e** normal, unripe fruit; **f** ripe fruit with appendages; **g** mericarp from ventral side with do.; **h** fruit with appendage on pedicel. e—h × 10.

Masafuera: In the alpine region, trailing in the moss mats, probably not uncommon. Western precipice, a short

distance north of Buque Varado, c. 1230 m (fl.-fr. $^{7}/_{3}$ 17, no. 367 b); fell-fields near the Correspondencia Camp, c. 1200 m; in moss among the rocks of Las Torres, 1370 m (fl.-fr. $^{14}/_{2}$ 17, no. 367); C. del Barril, 1110 m (fr. $^{1}/_{3}$ 17, no. 530); Los Inocentes, 1375 m.

The curious appendages do not appear to have been found in any other species. Their nature is problematic. In the cases where each carpel ends in such a tail-like process it would lie near at hand to regard them as enlarged, persistent styles, but this explanation is impossible, as they are situated outside the disc; inside this the traces of the styles will be found. In several instances as many as three were found on one carpel (fig. 25 g): in two cases such an appendage was found attached to the pedicel (fig. 25 h). Finally, many plants did not have any at all.

G. masafueranum is related to a number of Andine species, such as *G. fuegianum* Hook fil., *uncinulatum* DC., *canescens* Kunth and *andicola* Krause. The latter three are larger plants with many-flowered inflorescences and with much longer hairs on the fruits and leaves; *G. fuegianum* has larger leaves, long pedicellate flowers and a glabrous stem, and all of them have barbed setae om the fruit.

Area of distribution: Endemic in Masafuera.

Campanulaceae.

Wahlenbergia Schrad.

In Monogr. Camp. (1830) 160 ALPHONSE DECANDOLLE described *W. fernandeziana* A. DC. Four years later COLLA (Mem. Accad. Torino XXXVIII. 118, tab. 35) described *Campanula Larraini* Bert. ined. COLLA stated that, to judge from DECANDOLLE's diagnose, *C. Larraini* was different. The material quoted by DECANDOLLE and collected by Mrs. GRAHAM, DOUGLAS and SCOULER shows that his species comprised several forms, for Mrs. GRAHAM collected *W. Grahamae* Hemsl. and what I call *W. fernandeziana* s. str. and DOUGLAS and SCOULER collected *W. Larraini*. This explains why A. P. DECANDOLLE, Prodr. VIII. 438 referred *W. Larraini* to *fernandeziana* as a synonym.

The question of nomenclature becomes complicated by the fact that there are two types among BERTERO's plants, both under no. 1443. I do not know if COLLA did see both, anyhow, his description and plate answer very well to one of them, and this I have retained here as *W. Larraini*. DC. Prodr., HEMSLEY and JOHOW write *Wahlenbergia Larraini* Bert., Colla, but COLLA did not admit the genus *Wahlenbergia*, but brought his species to *Campanula*.

HEMSLEY, Challenger Report 45 rejects *Larraini*, but describes the new species *Grahamae*, based upon a part of Mrs. GRAHAM's material. JOHOW admits one species only, *W. fernandeziana* A. DC. For some reason he compares the narrow-leaved species (my *Larraini*) with *W. Berteroi*, which is a quite different thing; he declares that he found all sorts of transitions between *Larraini* and *Grahamae*. It is true that there are forms apparently intermediate between *Grahamae* and *fernandeziana* s. str., but nobody who has seen these

species growing wild should propose to unite *Larraini* with *Grahamae*. JOHOW believes that the size and shape of leaves and flowers undergo so great changes with the external conditions that all differences will be explained in this way. He writes p. 75: »En los terrenos húmedos i sombríos se encuentran ejemplares robustos con hojas muy anchas que convienen con la descripcion de la W. Grahamae Hemsl.» — but this species is at home on the steep rocky ridges and grows exposed to full sunlight; nor is it true that the typical *fernandeziana* grows »en los lugares ménos fértiles».

All the species are small shrubs with strong, persistent root. The inflorescence is terminal, and the flowering branches die in the autumn, at least the upper, floral part, while innovations are developed from their lower leafy part or from older branches.

Key to the species formerly united under *W. fernandeziana*.

I. Corolla campanulate, white, with narrow contracted lobes; calyx segments narrow, entire; leaves lanceolate or linear-lanceolate, ± acuminate. *W. Larraini.*

II. Corolla ± broad campanulate to funnel-shaped with dark purplish veins; calyx segments dentate. Leaves lanceolate-ovate.
   A. Leaves glabrous or nearly so, narrower toward the base: corolla campanulate with ± erect lobes. ..... *W. fernandeziana.*
   B. Leaves pubescent, with broad base, semiamplexicaul; corolla very broad with broad, revolute lobes. ..... *W. Grahamae.*

111. **W. Larraini** (Bert., Colla) Skottsb. — Syn. *Campanula Larraini* Bert. ined., COLLA l. c.; JOHOW, Estud. 75, sub *W. fernandeziana*. — Fig. 26 a—e.

Masatierra: BERTERO[1] no. 1443 ex p.! SCOULER! DOUGLAS! — On the low, dry ridges between the valleys; Pto Frances, Loma Incienso, in shrubberies, 360 m; Q. de la Pesca de los Viejos, c. 225 m, in a small ravine (fl. $^{13}/_{12}$ 16, no. 127); C. Salsipuedes, one plant in the height of c. 75 m, several higher up, c. 465 m (beg. fl. $^{8}/_{12}$ 16, no. 51 — f. parce pilosa); between Q. Juanango and La Vaquería, c. 300 m. — A form with spread hairs on the leaves was also collected by SCOULER and DOUGLAS!

Suffrutex erectus plerumque glaberrimus, dense ramosus, ramis suberectis sat dense foliosis. Caulis glaber. Folia coriacea, lanceolata vel lineari-lanceolata, 20—30 mm longa, 4—8 mm lata, basi angustata, apice acuminatim producta, argute serrata, supra glabra vel secus medianum pilosa, subtus glabra vel rarius pilosiuscula. Flores contracte paniculati. Calyx glaber lobis angustissimis acutis, integris vel rarissime denticulo glandulaeformi uno vel altero munitis. Corolla ± anguste campanulata, glabra vel secus marginem loborum pilosiuscula, alba, 14—15 mm longa, fauce 6 mm diam., expansa ad 15 mm lata, lobis angustis erecto-patentibus apice convolutis, 6—7 mm longis et basi 4 mm

[1] BERTERO named the plant in honour of a certain Mr. LARRAIN, who seems to have communicated some species from Juan Fernandez. This gentleman is not included in the list of collectors compiled by JOHOW, and I have not seen herbarium labels with his name.

latis. Stamina 3,2—3,5 mm longa, filamentis triangulato-linearibus ad 1,5 mm longis, basi setis nonnullis instructis, antheris ad 1,8 mm. Stylus 4 mm longus, sub apice incrassatus et parce pilosus.

Area of distribution: Endemic in Masatierra.

112. **W. fernandeziana** (A. DC. ex p.) Skottsb. — JOHOW, Estud. 75. — Plate 20, fig. 9; text fig. 26 i—l.

Masatierra: Mrs. GRAHAM! BERTERO no. 1443 ex p.! GAY! SKOTTSBERG 1908 no. 417! — On the higher ridges in the centre of the island, or in open stations below the forest. North face of Co Damajuana, 530 m; Co Pirámide, near Portezuelo, abundant in one place; V. Colonial, C. Central, 570 m,

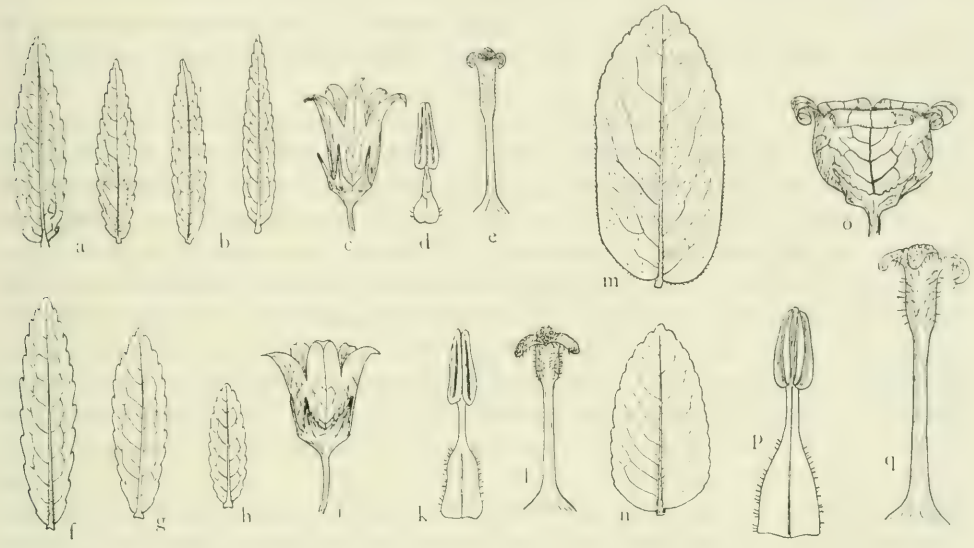


Fig. 26. **a**—**e** *Wahlenbergia Larraini:* **a** leaves (no. 51), lower and upper surface; **b** same of no. 127, upper and lower surface; **c** flower, **d** stamen, **e** pistil; a—c nat. size, d—e × 5. **f**—**l** *W. fernandeziana:* **f** leaf of no. 267 (upper surface), **g** no. 325 (lower surface), **h** 305 (do.), **i** flower, **k** stamen, **l** pistil; f—i nat. size, k—l × 5. **m**—**q** *W. Grahamae:* **m**—**n** leaves, upper and lower surface, **o** flower, **p** stamen, **q** pistil; m—o nat. size, p—q × 5.

with the following (beg. fl. $^{18}/_{1}$ 17, no. 305); Pta San Carlos, near the sea, rare (fl. $^{9}/_{1}$ 17, no. 267); Pto Ingles, central ridge (fl. $^{19}/_{1}$ 17, no. 325); ridge between Co Yunque and Villagra, c. 200 m (fl. $^{7}/_{1}$ 17, no. 264). A f. *elata* with long, thin, less densely foliate branches and very lax inflorescence was collected near Portezuelo (fl. $^{19}/_{3}$ 17, no. 1223).

Suffrutex erectus subglaber, ramis curvato-erectis dense foliosis, caule plerumque glabro. Folia subcoriacea, lanceolata vel lanceolato-ovata, sessilia, basi et apice sensim angustata, dense et argute serrata, reticulatim nervosa, glabra vel supra secus medianum puberula, 15—30 mm longa et 5—9 mm lata. Inflorescentia ± laxe paniculata, floribus longe pedicellatis, pedicellis glaberrimis, bracteis foliosis ovato-triangularibus. Calyx glaber apice violaceus lobis triangulatis 5—6 mm longis basi 2—2,5 mm latis, margine parce glanduloso-denticulatis. Corolla ampla campanulata, extus puberula, 15—16 mm longa, aperta

usque ad 20 mm diam., fauce 9 mm diam., alba, inferne pulchre purpureo-venosa, lobis 6—7 mm longis basi 4—4,5 mm latis, paulo reflexis, planis, margine puberulis. Stamina filamentis 3 mm longis a basi lata subiter angustatis, valde setosis; antherae 2 mm longae. Stylus ad 5,5 mm longus, versus apicem incrassatus nec non dense setosus, lobis stigmatiferis margine et subtus pilosis.

Area of distribution: Endemic in Masatierra.

113. **W. Grahamae** Hemsl. — JOHOW, Estud. 75 sub *fernandeziana*. — Plate 15, fig. 1; Plate 20, fig. 10; text fig. 26 m—q.

Masatierra: Mrs. GRAHAM! MOSELEY! — Mountain ridges in the centre of the island. V. Colonial, C. Central, 570 m (fl. $^{18}/_{1}$ 17, no. 306); Portezuelo de Villagra, near the pass and abundant in places, 550—600 m (fl. $^{15}/_{12}$ 16, no. 1226; fl. $^{24}/_{12}$ 16, no. 1224, f. minus scabra ad praecedentem vergens; fl. $^{10}/_{1}$ 17, no. 1225, f. laxior); B. Villagra, rock wall at the back of Q. de la Choza, c. 400 m.

No. 1226 is the most extreme *Grahamae* that I have seen. Of the others nos. 1224 and 1225 have smaller flowers, measuring only 20 mm across. The possibility of bastards occurring between this and the former should be considered.

Suffrutex effusus, vage ramosus ramis prostrato-adscendentibus longis subflexuosis, pubescenti-setosis foliosissimis. Folia chartacea, sessilia, ovato-lanceolata vel ovata, acutiuscula, basi lata fere semiamplexicaulia, dense sed interdum indistincte denticulata, utrinque pubescenti-scabra, subtus in nervis dense pilosa, 20—35 mm longa et 10—16 mm lata. Inflorescentia pseudo-umbellata, foliis triangulato-ovatis instructa, haud multiflora sed ob magnitudine florum valde conspicua. Calyx glaber lobis triangulatis 5—7 × 2—3 mm, inferne dentatis. Corolla late campanulata vel sub fauce leviter constricta fere globoso-campanulata, extus puberula, alba, eximie purpureo-venosa, cum lobis 13—15 mm longa, expansa ad 25 mm lata, fauce 16—17 mm diam., lobis revolutis late triangularibus 7—8 mm longis et 8—10 mm latis, margine puberulis. Stamina filamentis 3—4 mm longis a basi lata valde angustatis; antherae 1,5—2 mm longae. Stylus 6,5—8 mm, versus apicem incrassatus et cum pagina inferiore stigmatorum setosus.

Area of distribution: Endemic in Masatierra.

114. **W. Masafuerae** (Phil.) Skottsb. Stud. 6. — Syn. *W. tuberosa* Hook. fil., JOHOW, Estud. 78.

Masafuera: GERMAIN! GUAJARDO! — coast cliffs from B. Toltén to Varadero and Lobería, rather common; also in the outer part of the canyons, on rock ledges and in crevices. Only once observed in the highlands, north of Casas, c. 1200 m. Fl.-past fl. Feb. 1917, no. 428.

f. *rosea:* A typo differt corolla praecipue basin versus pulchre rosea. — **Masafuera:** Q. de la Lobería, one large specimen found among the typical plants (fl. $^{17}/_{2}$ 17, no. 489).

When describing *Euphorbia Masafuerae* (Bot. Zeit. XIV. 647) PHILIPPI felt sure of the generic position, but later he began to doubt the correctness, as shown by GUAJARDO's specimen, labelled in PHILIPPI's hand-writing: »Euphorbia? Masafuerae Ph. (nonne potius Wahlenbergia?) Masafuera 1869 Leybold».

In Stud. 6 I quoted this species from Masatierra also. There were two sheets of a *Wahlenbergia* in Herb. Lund; they had no labels, but on the sheets was written in J. G. AGARDH's hand-writing: »Juan Fernandez, D. DOUGLAS no. 48». As D. never visited Masafuera, I concluded that they came from Masatierra. They did not belong to the species known before from Masatierra; thus, only *W. Masafuerae* remained, or a new species. Habitually they looked like the former, but differed in the closer serrature of the leaves; that were glabrous and had a somewhat different venation. The basal parts of the specimens were missing.

Comparing these specimens a second time with the rich material of *W. Masafuerae* now at hand, I found that the differences quite forbid an identification. I further found that, apart from these specimens, nothing like them had ever been collected in Juan Fernandez, nor did such a species exist among DOUGLAS's plants in Herb. Kew. During my visit to that herbarium last year I had a look at the *Wahlenbergiae* from Saint Helena, and was at once struck by the great likeness between *W. linifolia* A. DC. and the plants in Herb. Lund. Some time ago I sent for both and was able to establish their identity. The examination of a capsule of the alleged DOUGLAS plant revealed that it is 2-valvous as in all the St. Helena species, while all Juan Fernandez species have 3-valvous capsule. Certainly we can draw no other conclusion than that the statement on the Lund specimens is quite false. And if we go back to DOUGLAS's journal, only lately published, we read under no. 48: »Campanula(?) leaves alternate, sessile, lanceolate, serrate, smooth above, slightly pubescent underneath» etc. DOUGLAS no. 48 is *W. Larraini*. The person who distributed the plants in question to Lund has made a rather dangerous mistake.

Area of distribution: Endemic in Masafuera.

115. **W. Berteroi** Hook. et Arn. — JOHOW, Estud. 75. — Syn. *Campanula gracilis* var. *revoluta* Colla l. c. 119. — Plate 20, fig. 8.

Masatierra: BERTERO no. 1440! »ad rupium fissuris in montibus editioribus et in Goats island». Rediscovered in Masatierra by us, but not in the »higher mountains»: B. Cumberland, Pta San Carlos, two small specimens (fl. $^{9}/_{1}$ 17, no. 265); in the sand outside the caves, one large and beautiful plant (fl. $^{7}/_{12}$ 16, no. 43). Both localities near the sea.

Santa Clara: BERTERO (»Goats island»); JOHOW! — Morro de los Alelíes (also observed by JOHOW), fr., some few fl. left, $^{26}/_{1}$ 17, no. 345.

W. Berteroi has (just as *W. Masafuerae*) a large, lactiferous subterranean bulb, formed by the base of the primary stem together with the primary root. From the surface of this bulb spring the vegetative-floral shoots, each apparently of one year's duration. The shape of the corolla is unlike that in other species. Its colour is a deep rosa, the base crimson. Style and stamens are rose-coloured, anthers golden yellow. The style is much longer than in other species, the stigma visible in the mouth of the corolla. As the figure of HOOKER and ARNOTT in HOOKER's Journ. 1 (1834) plate 137 is incorrect as to the flower, another was prepared. The flower figured here was trimerous throughout with 6 sepals etc., an anomality sometimes observed.

Area of distribution: Endemic in Masatierra and Santa Clara.

Lobelia L.

116. **L. anceps** Thunb. — JOHOW, Estud. 76. — Syn. *L. rupicola* Colla, Mem. Accad. Torino XXXIX (1834) 120.

Masatierra: El Pangal, wet rocks near the waterfall, 215 m (fl. $^{1}/_{1}$ 17, no. 221); Pto Ingles, moist rocks near the sea (fl.-unr. fr. $^{20}/_{1}$ 17, no. 314; also found by BERTERO and by JOHOW).

Masafuera: coast rocks near Q. de las Casas, where water trickles down (also observed by JOHOW); in the Casas canyon, humid rock wall; in the interior of Q. de las Vacas (fl.-past fl. $^{13}/_{2}$ 17, no. 496); Q. del Varadero, at the waterfall in the small branch of the canyon.

A variable species that ought to be studied on material from different countries. In Juan Fernandez, the colour of the flower ranges from a deep lilac blue to almost white. REICHE, Fl. Chil. V. 87 writes »planta anual?», but the Juan Fernandez plant is perennial, as usually stated.

Area of distribution: South Africa, Australia, New Zealand, Chile from prov. Maule to Valdivia; Juan Fernandez.

Compositae.

Lagenophora Forst.

117. **L. Harioti** Franch. — Syn. *L. hirsuta,* SKOTTSBERG, Stud. 5. — Fig. 27 f—i, 28 f—g.

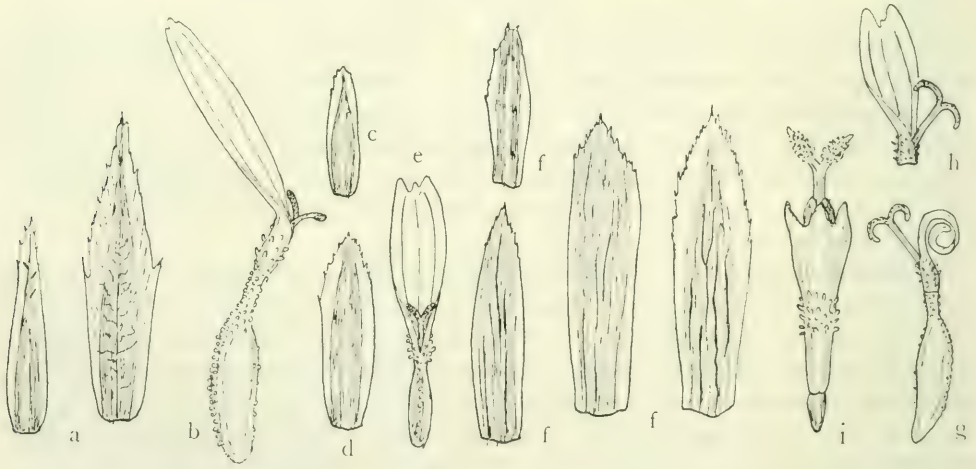


Fig. 27. **a—b** *Lagenophora hirsuta,* orig. POEPPIG: **a** involucral scales, **b** ray floret. **c—e** *L. nudicaulis* from Falkland Isl., leg. SKOTTSBERG: **c, d** involucral scales, **e** ray floret. **f—i** *L. Harioti* from Masafuera: **f** involucral scales, **g** ray floret, **h** expanded ligule, **i** disc floret. — All × 10.

Masafuera: Alpine fell-fields, scarce. Highland north of Casas, from 1130 m to the top of Las Torres, 1370 m (fl.-fr. $^{14}/_{2}$ 17, no. 484); C. del Barril, c. 830 m, rare, 925 m more common (fl.-fr. $^{1}/_{3}$ 17, no. 536); Los Inocentes, c. 1375 m.

The insular plant is certainly identical with *L. Harioti* Franch. Miss. sci. Cap Horn V. 344, of which I have seen type material from Herb. Mus. d'hist. nat. in Paris. Another question is if this is different from *L. nudicaulis* (Comm.) P. Dus. (fig. 27 c—e, 28 a—b). *L. Harioti* (fig. 28 c—e) is larger and more slender, the leaves less crowded, more distinctly dentate and always pubescent. The involucral scales are larger, c. 4 mm, rarely exceeding 3 mm in *nudicaulis*. The flowers are slightly larger, but the achenes look very much the same in both. There may be as much reason to regard *L. Harioti* as a form of the other, in which case the name var. *gracilis* (Alboff) should be used. ALBOFF, Contr. Fl. Terre de Feu II. 27 placed his variety under *L. hirsuta* Less. It has

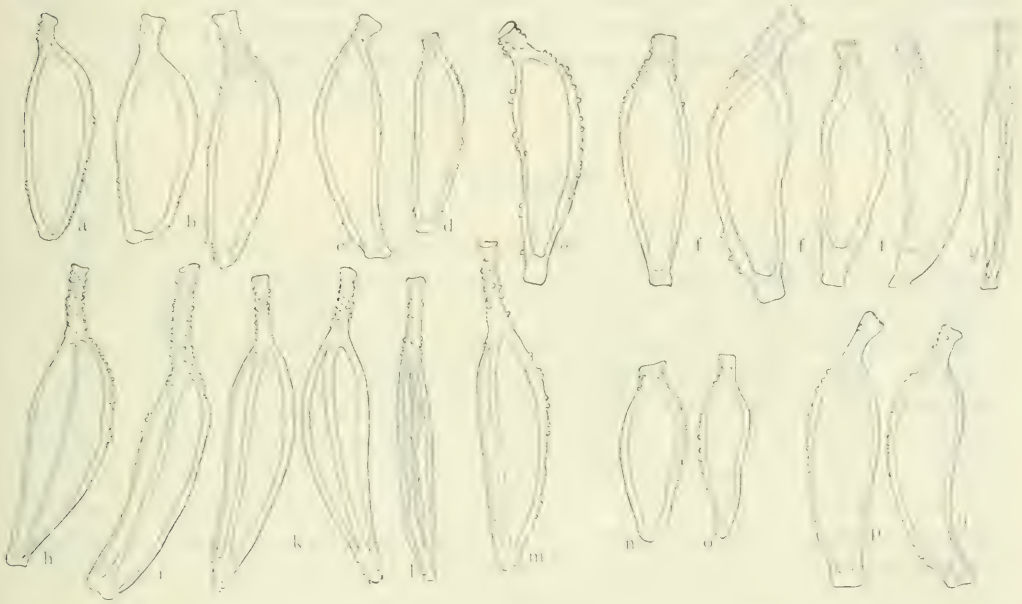


Fig. 28. Achenes of *Lagenophora*. a, b *L. nudicaulis*, a orig. COMMERSON, b ex herb. LINK (Berlin). c—g *L. Harioti*: c Cord. Rio Manso leg. REICHE, d Cord. Linares leg. REICHE, e Fuegia leg. SKOTTSBERG no. 151, f Masafuera, g Masafuera, dorsal view. h—m *L. hirsuta*: h orig. POEPPIG, i Cord. Rio Manso leg. REICHE, k—l Cord. Valdivia leg. NEGER, from both sides and from the back, m Cord. Nahuelbuta leg. REICHE. n—o *L. pumila*: n leg. BASTIAN, o leg. COCKAYNE no. 79. p—q *L. petiolata*, p leg. COLENSO, q leg. HAAST. — All × 16.

nothing to do with this. *L. hirsuta* (fig. 27 a—b, 28 h—m) is known by the shape of the leaves, that are larger and more deeply crenate, and especially by the long beak of the achene, which also has strong lateral nerves absent in the others, as seen from fig. 28 h—m; these nerves are also visible in the figure of POEPPIG and ENDLICHER, Nov. gen. et spec. plant. II tab. 26, though not mentioned in the descriptions. I have figured one achene of the original material (fig. 28 h). *L. Harioti* has been mistaken for *hirsuta* on account of the hairy leaves, also by the writer (Zur Flora des Feuerlandes, Wiss. Erg. Schwed. Südpolar-Exp. IV: 1: probably all the specimens quoted belong to *L. Harioti*). FRANCHET regarded his species as »bien différente de *L. Commersonii* (= nudicaulis) et voisine de *L. Forsteri* (= pumila)»: comp. fig. 28 n—o. Still, it is much nearer to the former. *L. pumila* differs in the shape of the leaves and bracts and also

in the smaller achenes with their very short beak. The achene of *L. Harioti* is more like that in *L. petiolata* Hook f. (fig. 28 p–q). Both pumila and petiolata come from New Zealand. All the species in question form one small natural group.

The type material of *L. Harioti* was out of flower: ALBOFF describes these as light rose-coloured. In the plant from Masafuera the colour varies from white to rose, turning ± crimson with age.

I have seen *L. Harioti* (determined as hirsuta or sometimes nudicaulis) from the following stations: Fuegia, Ile Clarence, Sholl Bay, HARIOT $^{15}/_{5}$ 1883 (type); Ushuaia, in pratis alpinis $^{11}/_{3}$ 1902, SKOTTSBERG no. 151; Chile, Cord. Linares, 2200 m, Jan. 1897, REICHE; Cord. of Rio Manso, 900—1400 m, Feb. 1896, REICHE; Cord. of Chillan, 2000 m, Jan. 1895, REICHE.

Area of distribution: Andes of South Chile to Fuegia; Masafuera.

Erigeron L.

In the large collections of Santiago, Kew etc. I have not met with any near relatives of the island species. It is noteworthy that not one of the numerous alpine species, described from Chile by PHILIPPI, seems to be related to the new forms from the mountains of Masafuera. In order to get the opinion of a specialist, I asked Professor VIERHAPPER to examine my material and to compare my new species with the collections in the Vienna museums, what he most willingly did. He thinks, and here I quite agree with him, that all the island species, in spite of their different habit, are related to each other; *E. rupicola* is very unlike the rest, but the principles of its morphology are the same as in the others. Professor VIERHAPPER mentions the following species as more or less related to the insular forms: *E. lepidotus* Less. (Hawaii), *spiculosus* Hook. et Arn. (Chile), *uliginosus* Benth. (Columbia) and *heteromorphus* Rob. (Mexico). HEMSLEY compared *E. fruticosus* (Juan Fernandez) with *E. Darrellianus* Hemsl. (Bermuda). Prof. VIERHAPPER adds: »Als besonders wichtiges gemeinsames Merkmal erscheint mir die ± tiefe Serratur der Blätter, die z. B. bei *spiculosus* genau so ist, bei *lepidotus* allerdings nicht, der aber dafür sonst dem *fruticosus* sehr nahe zu stehen scheint».

118. **E. fruticosus** DC. — JOHOW, Estud. 51; SKOTTSBERG, Stud. 4. — Fig. 29 a—c.

Masatierra: Rocky and stony ground on the high ridges or near the sea, also in the dry western parts of the island, but not reported from the eastern section. North-east corner of El Yunque, c. 580 m; V. Colonial, C. Central on the crest, 570 m (also JOHOW); Cave no. 6, one specimen; Portezuelo de Villagra (also observed by JOHOW), 500—600 m, not uncommon (fl. $^{3}/_{12}$ 16, no. 9); Q. del Monte Maderugo, road-side in the macal, 240 m, two specimens; C. Salsipuedes, c. 600 m (fl. $^{8}/_{12}$ 16, no. 73); between La Vaquería and Q. Juanango, rather abundant; south slope of Co Tres Puntas; C. de las Cabras, 380 m; B. Chupones, among rocks in the grass (fl. $^{5}/_{1}$ 17, no. 255).

Masafuera: Scattered on the ridges and in the canyons; Q. de las Chozas, *Dicksonia*-grove; Q. de las Casas (also observed by JOHOW), rare; Q. Inocentes, c. 500 m, abundant; Q. Angosta; Q. del Varadero, rare; slopes above Las Chozas, 700—750 m, in the grass (fl. $^{12}/_{2}$, $^{25}/_{2}$, no. 524); C. del Barril, c. 750 m.

f. *majuscula* n. f. — Fig. 29 d—e. — A typo differt statura majore et magnitudine omnium partium. Rami ad 70 cm longi et 6,5 mm crassi, dense foliosi. Folia ad 18 cm longa et 2 cm lata, sat profunde lacerata. Panicula amplissima. Flores ♀ ad 7 mm longi, tubo 3, limbo 4 mm. Achaenia ut in typo. **Masafuera:** Q. de las Casas, one specimen in the bottom of the gorge in a shady corner (fl. $^{6}/_{3}$ 17, no. 375). — Looks like a »gigas-form». *Aster erigeroides* Hook. et Arn. (= E. fruticosus) β *proliferus* Comp. Bot. Mag. II. 48 is a large-leaved form, but nothing is said about the size of the heads etc.; it is described »corymbis quasi lateralibus», an expression difficult to understand.

Area of distribution: Endemic.

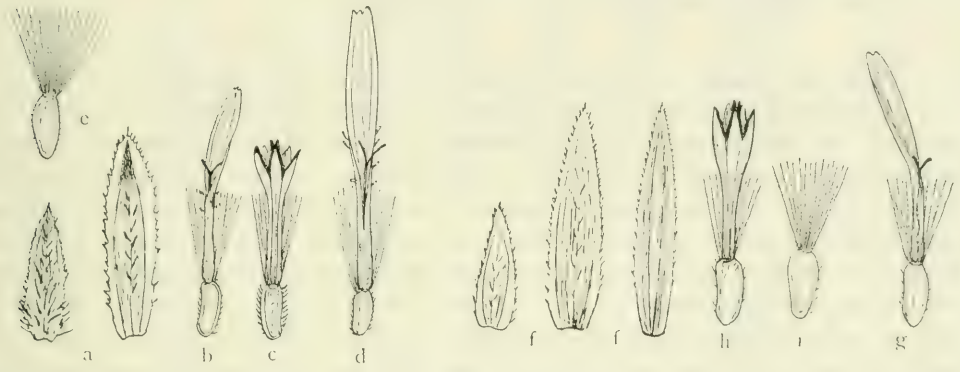


Fig. 29. a—e *Erigeron fruticosus:* a outer and inner scales, b ray and c disc floret; d—e f. majuscula, ray floret and achene. f—i *E. luteoviridis,* f outer and inner scales, g—h ray and disc floret, i achene. — All × 6.

*119. **E. luteoviridis** nov. spec. — Fig. 29 f—i.

Euerigeron suffruticosus polycephalus subglaber luteoviridis. Radix primaria persistens lignosa longissima (ad 58 cm longa visa), valde ramosa, multiceps. Caulis lignosus plerumque a basi ramosus; innovationes basales internodiis inferioribus elongatis, ceteris brevissimis folia rosulatim conferta gerentibus. Rami florigeri 20—30 cm longi, rigidi, glabri, striati. Folia inferiora dense rosulata, anguste spathulata vel lineari-lanceolata, acuta, in petiolum semiamplexicaulem longissime attenuata, plerumque 5—8 cm longa et 4—6 mm lata, versus apicem dentibus acutis parvis incrassatis utrinque circ. 5 munita, reticulatim nervosa nervo mediano permanifesto, pallida, lutescenti-viridia, subglabra (pilis nonnullis marginalibus) vel glaberrima, valde firma quasi coriacea; folia caulina inferiora similia, superiora linearia, integra, 2—4 cm longa et 2—3 mm lata. Capitula ex axillis supremis orta, subumbellatim disposita, pauca — sat numerosa, circ. 8 mm diam., inferiora pedunculis elongatis 3—5 cm longis, bracteolatis, simplicibus vel infimis parce ramosis, glabris vel parce pilosis suffulta. Involucrum 5—5,5 mm altum, 4,5—5 mm diam., subglabrum. Squamae lanceo-

latae, acutae, hyalino-marginatae, minute laceratae nec non parce piligerae, paucae exteriores breviores 2,5—3 × 1 mm, intermediae numerosae 4,5—5 × 1,2 mm, intimae angustiores glaberrimae. Flores radii omnes ♀ ligulati albi glaberrimi, tubo circ. 2 mm longo, ligula angusta suberecta apice indistincte lobulata circ. 3 mm longa; flores disci ☿ corolla 3—3,5 mm longa lutea. Achaenia ovata compressa subglabra, 1,5 mm longa et 0,6—0,7 mm lata. Pappus circ. 2,5 mm longus.

Masafuera: In the alpine region; edge of western precipice, above Buque Varado, c. 1200 m (fl.-fr. $^{7}/_{3}$ 17, no. 558); C. Atravesado, c. 1350 m (fl $^{15}/_{2}$ 17, no. 500). No. 558 differs from the type (no. 500) in the broader, more coarsely serrate leaves.

Near *E. fruticosus,* but undoubtedly quite distinct. The light colour and the thick leaves characterize the new species; *E. fruticosus* is pure green, much more villous, and has much thinner leaves, generally also a distinct trunk, which attains the height of a few feet.

Area of distribution: Endemic in Masafuera.

*120. **E. Ingae** nov. spec. — Plate 16, fig. 1; text fig. 30 a—d.

Euerigeron perennis basi suffruticosus hirsutus oligocephalus. Caudex sat profunde infossus lignosus di- polychotome ramosus, radicibus numerosis chordiformibus; innovationes basales longi subrosulatim foliosi. Caules florigeri ad 30 cm vel ultra alti, sat robusti, adscendentes—erecti, sulcato-striati, pilis longis albis pluricellularibus ± dense villosi. Folia basalia rosulata, infima tempore floris jam emortua, spathulata, in petiolum basi dilatatum longe angustata, acuta vel obtusata et mucronata, superne grosse serrato-dentata dentibus late triangulatis mucronulatis utrinque 1—3(—4), sat obscure viridia, undique sparse et longe villosa, 4—7 cm longa, 8—12 mm lata; caulina sensim minora, spathulato-linearia, breviter petiolata, margine dente uno vel altero instructa, suprema sublinearia, 2—4 cm longa et 3—5 mm lata, integra. Caulis sub capitulo terminali leviter incrassatus. Capitula terminalia et ex axillis supremis 1—3 (rarius ad 5) lateralia, pedunculis tenuibus villosis ad 9—12 cm longis caulem superantibus suffulta, 16—18 mm diam. Involucrum 7—8 mm altum et 10 mm crassum. Squamae, exterioribus paucis brevibus exceptis, 6,5—7,5 mm longae et 1—1,2 latae, lanceolatae, acutatae, margine et dorso villosae, intimae margine irregulariter hyalino-laceratae, parce pilosae—glabriusculae. Flores ♀ ad 9 mm longae, albae, corolla 7—8 mm longa, tubo perparce villoso. Flores ☿ 5,5 mm longi lutei. Achaenia valde compressa, margine incrassato setoso, in latere basi et apice pilis nonnullis inspersa, 2—2,3 mm longa et 1 mm lata, pappo circ. 2 mm longo.

Masafuera: Las Torres, on rock ledges, 1370 m (fl. $^{15}/_{2}$ 17, no. 391); Los Inocentes, c. 1350 m (fl.-fr. $^{9}/_{3}$ 17, no. 556). — Named in honour of Mrs. INGA SKOTTSBERG.

var. **Innocentium** nov. var. — Fig. 30 e—h. — A typo differt foliis conspicue latioribus, basalibus spathulatis 4—7 cm longis et 1—2 cm latis, late rotundato-obtusis, mucronulatis, margine grosse sinuato-dentatis, caulinis ovato-lanceolatis subintegris vel integris, 2—2,5 cm longis et 7—12 mm latis. Inflore-

scentia magis contracta. Involucri squamae 5—6 mm longae; flores ♀ 7 mm, ☿ 4 mm longi. Achaenia 1,5 mm solum longa, pappo aequilongo. — **Masafuera:** Los Inocentes, c. 1400 m (fl.-fr. $^{9}/_{3}$ 17, no. 557). — Only very few specimens observed; habitually somewhat different on account of the broader leaves and also notable for the smaller flowers, but more material is required in order to decide whether it deserves the rank of a species.

Area of distribution: Endemic in Masafuera.

Fig. 30. **a—d** *Erigeron Ingae:* **a** largest outer, and inner scales, **b** ray and **c** disc floret, **d** achenes; **e—h** var. *Innocentium,* **e** outer and inner scales, **f** ray and **g** disc floret, **h** achene. All × 6.

*121. **E. turricola** nov. spec. — Plate 16, fig. 2; text fig. 31 a—g.

Euerigeron perennis caespitosus parvulus monocephalus. Rhizoma adscendens, radicibus numerosis fibrosis, multiceps. Folia carnosula firma, dense rosulata, spathulata, petiolo laminam aequante usque ad duplo superante, obtusato-rotundata et apiculata, dentibus utrinque 1—2 sat manifeste mucronatis ornata, 3—4 cm longa et 3—7 mm lata, saltem secus marginem pilosa vel undique hirsuta, pilis longis pluricellularibus. Scapus 5—12 cm altus, sulcato-angulatus, strictus vel leviter curvatus, subglaber—hirsutus, monocephalus vel rarissime ex axillo supremo capitulum alterum producens, perparce foliosus superne nudus, folia caulina 3—7 linearia acutiuscula 1—2,5 cm longa, summa vel interdum omnia valde reducta bracteiformia. Capitulum circ. 15 mm diam. Involucrum 5 × 6 mm. Squamae una vel altera brevis, triangulata 2,5 × 1 mm solum

metiens, ceterae 4—5 × 1—1,2 mm, lanceolatae, acutae, denticulatae, dorso dense hirsutae; intimae subglabrae, margine solum dense ciliatae nec non scariosae et denticulatae. Flores ♀ albi, circ. 9 mm longi, limbo angusto ± distincte tridentato patente, 4,5—5 mm longo, tubo extus pilis nonnullis insperso. Flores ☿ flavi, 4,5—5 mm longi. Achaenia ± oblique ovata, compressa, margine incrassato hirsuto ceterum subglabra vel sub apice pilis paucis bifurcatis inspersa,

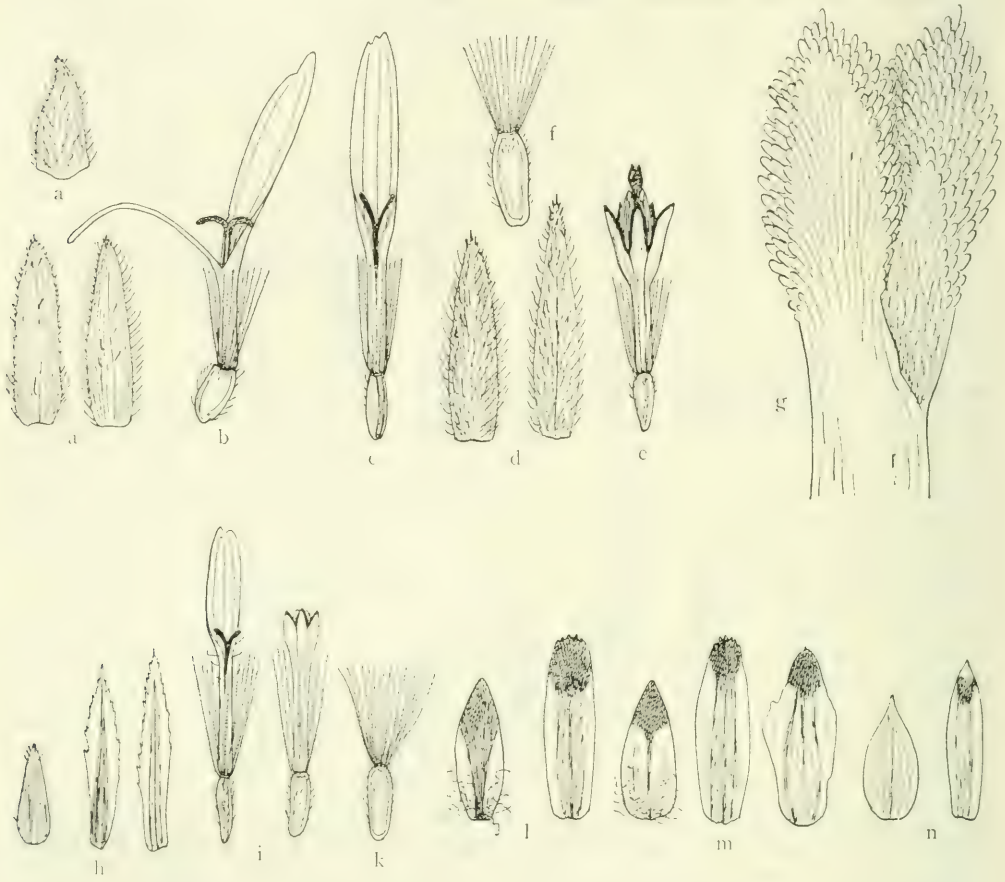


Fig. 31. **a**—**f** *Erigeron turricola:* **a** outer and inner scales, **b** bilabiate and **c** normal ray floret, all from f. glabrior; **d** scales from hairy specim., **e** disc floret, **f** achene, **g** top of style. **h**—**k** *E. rupicola:* **h** one outer and two inner scales, **i** ray and disc floret, **k** achene. **l**—**m** *Gnaphalium spiciforme,* outer and inner scales, **l** of LECHLER no. 1250 ex p., **m** from Masafuera. **n** *G. spicatum* no. 118, scales. — g × 50, all others × 6.

1,5—2 mm longa et 0,8 mm lata, pappo ad 2,5 mm longo. Adsunt interdum flores ♀ bilabiati (fig. 31 b).

Masafuera: alpine fell-fields near Las Torres, 1350—1370 m (disp. fr. $^{14}/_{2}$ 17, no. 483 b, c; — f. glabrior); humid moss-mats (fl. $^{15}/_{2}$ 17, no. 483); C. del Barril, 1290 m (f. glabrior); Los Inocentes, 1350—1400 m.

Another characteristic species of the well known »alpine» habit. The leaves are variable as to shape and degree of pubescence, but I think all the specimens collected belong to the same species.

Area of distribution: Endemic in Masafuera.

122. **E. rupicola** Phil. — JOHOW, Estud. 51. — Fig. 31 h—k.

Masafuera: GERMAIN! without locality. — Common on the coast rocks: between Q. del Óvalo and Q. del Pasto; entrance to Q. del Mono (beg. fl. $^{10}/_{2}$ 17, no. 417 b); between Q. de las Casas and Q. de las Vacas (beg. fl. $^{10-15}/_{2}$ 17, no. 417); Q. Angosta, in the canyon; Q. del Varadero (fl. $^{12}/_{3}$ 17, no. 514 b); Rodado del Sándalo, abundant in places (fl. $^{17}/_{2}$ 17, no. 514); Q. de la Lobería, not uncommon. Seen once only in the alpine region, west of Q. Sanchez, 1100 m, one specimen (fl. $^{25}/_{2}$ 17, no. 541).

Of this peculiar plant only one small and incomplete specimen existed before, viz. the type in Herb. Santiago, so JOHOW believed that it was a very rare species, while in reality it is quite common in many places on the coast cliffs. As the description of PHILIPPI is incomplete, I shall add the following notes.

The morphology is the same as in the other species without a trunk; there is a stout, woody primary root of the multiceps type; the stems are woody, profusely branched, more or less prostrate, forming dense mats. The upper part of the flowering shoots dies in the autumn, while te base persists and carries innovations. The leaves are mainly basal but seldom so densely rosulate as in the others; they are long spathulate, entire, very obtuse, fleshy and perfectly glabrous, but otherwise rather variable in outline, 3– 7 mm broad and about 2—4 cm long, of which about one half belongs to the petiole. The upper leaves are reduced to bracts. The branches end in a terminal head; numerous lateral ones are developed in the axils of the upper leaves, borne on very long, filiform pedicels with some leaves below and bracts above; sometimes these leaves support a third generation of heads. As a rule, the pedicels are glabrous; the upper part, however, slightly pilose in no. 541. Often enough all the branches are abbreviated; if elongated, they are prostrate — ascending and rise a few cm only above the ground. The head measures 7 mm across, the involucre is 4,5 mm high and 5 mm wide, the scales 4—4,5 mm long, glabrous, the outer setulose near the tip, the others quite glabrous with scariose denticulate margin. The ♀ flower measures 7, the ☿ 5 mm. The achenes are typical, 1,5 mm long, hispid along the thickened margin and on the flat surface. Pappus 2—2,5 mm.

Area of distribution: Endemic in Masafuera.

Gnaphalium L.

123. **G. spiciforme** Sch. Bip. — Syn. *G. spicatum* Lam. var., SKOTTSBERG, Stud. 5. — Fig. 31 l—m.

Masafuera: In the alpine region, apparently rare; first found by the writer in 1908. Co Correspondencia, c. 1350 m (past fl.-fr. $^{15}/_{2}$—$^{5}/_{3}$ 17, no. 414); C. del Barril, 1290 m.

The determination of this plant remains uncertain. Anybody familiar with the present state of confusion in the genus will understand the difficulty of classifying a species belonging to the *purpureum* assemblage. It is not *G. spicatum;* this wide-spread species has been introduced to Juan Fernandez and

is easily known from the alpine *Gnaphalium* of Masafuera. This is strictly perennial with numerous rosulate innovations; the scape is simple or very little branched and has few leaves. The leaves are greenish grey above, snowy white with long, dense wool below, and the same kind of long, crisp wool thickly envelops the scape and heads. The latter form a dense, short almost globular spike, surrounded by leaves; sometimes there are some lateral glomerules, sessile or pedunculate. The compact globose spikes and the long crisp wool give to this form an appearance different from that of all forms of *purpureum* or *spicatum* that I have seen.

The involucral scales number 15 to 20, all the outer are short and broad, $3 \times 1—1{,}2$ mm, acute, greenish hyaline with dark brown apex; the inner are larger, $4 \times 1—1{,}5$ mm, obtusely apiculate to square, denticulate, green in the centre with broad hyaline edges and a dark brown or reddish brown tip. The head measures $4 \times 2{,}5$ mm. In *G. spicatum* the head is smaller and narrower ($3 \times 1{,}5—2$ mm), and not so dark, with all the scales acuminate or acute (fig. 31 n).

The species was brought to *G. spiciforme* after a detailed comparison with the type, LECHLER no. 1250, of which I have seen material in Upsala, Kew and Marburg. It includes two forms, one very like my plant, another with a leafy stem, grey wool and sessile clusters of heads in all the upper axils. The latter is = *G. mucronatum* Phil. in Herb. Santiago; REICHE brought this to *spiciforme*, but I think it is better to regard *mucronatum* as distinct and to bring a part of LECHLER no. 1250 to this.

I have seen the following specimens of *G. spiciforme*, as limited above: Sandy Point, LECHLER no. 1250 ex p. (type), fig. 31 l; Port Famine, KING (s. n. *G. falcatum*, very like the plant from Masafuera); Orange Harbour, WILKES (s. n. *G. consanguineum*); Bay San Nicolas (CUNNINGHAM). DUSÉN's *G. spicatum* from Lake Argentino in Patagonia (no. 5742) is similar in most respects. To judge from our present knowledge of *G. spiciforme*, this is a magellanic species with an outpost on Masafuera.

The sterile specimens of 1908 were compared with *G. consanguineum* Gaud. The fresh material clearly shows the difference between them, and *consanguineum* is brought to *spicatum* by most authors.

Area of distribution: South Patagonia; Fuegia; Masafuera.

Abrotanella Cass.

*124. **A. crassipes** nov. spec. — Fig. 32 a—h.

Pulvinatim caespitosa, caespite rotundato—subplano, denso nec non sat magno. Folia creberrime rosulata, linearia, haud marginata, curvato-patula, glabra, plerumque 10—15 mm longa, infra apicem 1,5—2 mm lata; lamina carnosa, supra punctulis depressis inspersa, apice rotundato-subconica, minutissime apiculata, versus basin leviter angustata deinde in vaginam subhyalinam nervosam intus glandulosam dilatata. Glandulae ferrugineae stipitatae clavatae multicellulares. Scapus in ramis terminalis, 1—2-foliatus, primo inter folia ± absconditus, statu fructifero elongatus nec non incrassatus et carnosus, ad

10—15 mm longus et 1,5—2,5 mm crassus, basi semper tenuis, leviter angulatus, monocephalus. Capitulum circ. 3 mm diam. Involucrum 6—8-phyllum squamis ovatis—latissime obovatis, obtusis, ± truncatis, viridibus apice ± roseo, margine hyalinis, uninerviis, basi praesertim glandulis (supra depictis) munitis, 2—2,2 mm longis. Flores obscure rubri, pauci—sat numerosi (ad 16 visi), circ. 3 mm longi: ♀ perpauci, ☿ magis numerosi, omnes fertiles, stylus floris ☿ distincte bifido fere ut in ♀. Calyx nullus. Achaenia ovoideo-fusiformia, obscure tetragona,

Fig. 32. *Abrotanella;* a—h *A. crassipes:* a branch, nat. size, b leaves, × 5, c scales, × 17, d scape with head, × 2,5, e ♀ and f ☿ flower, × 10, g achenes, × 17, h gland, × 150. i—k *A. linearifolia*, i scale and k achene, × 17. l—m *A. Moseleyi*, l scales, m achenes, × 17.

apice leviter concava et margine humili circumvallata, glabra, 2—2,5 mm longa, pappo plane destituta.

Masafuera: Only found on the top of Los Inocentes, 1325—1400 m, abundant in places (past fl.-fr. $^{9}/_{3}$ 17, no. 502).

A. crassipes is nearly related to *A. linearis* Berggr. (New Zealand) and to *A. linearifolia* A. Gray (West Patagonia, Fuegia). It differs from the former in the shape of the flowers and achenes and especially in the leaves, which have a long pilose sheath in *A. linearis*. I have not seen type material af *A. linearifolia,* but specimens from Pto Churucca in Herb. Kew are rightly named and

agree very well with the type; only, the involucral scales are said to be »sub 2—3-nervatae» (Proc. Amer. Acad. V. 137) and I find them 1-nerved (fig. 32 i). The achenes have a corona of 4—5 long bristles (fig. 32 k). These bristles are present in all the achenes, while there is no trace of them in *A. crassipes*. On the other hand, the glands described above seem to be absent. The plant found by the writer in Tierra del Fuego and named linearifolia (K. Sv. Vet.-Akad. Handl. LVI [1916], 318, Taf. 23, Fig. 27) differs from the ordinary one in its much more compact growth and in the much shorter, more canaliculate leaves. Perhaps it ought to be separated from *linearifolia,* but the coroniform pappus is the same.

It is, however, possible that *A. crassipes* is not confined to Masafuera. In Herb. Kew I found an unnamed specimen, labelled »Otway Harbour, Gulf of Penas, Patagonia. Coll. Mr. MOSELEY Jan. 1876. REED June 1876». It is very like my plant; the leaves are a trifle narrower, the scape not at all incrassate, in spite of the achenes being ripe, but some scapes in *crassipes* are less elongated and incrassate than the rest. The scales (fig. 32 l) have the same general outline and there are a few glands of the same kind. The achenes are more distinctly clavate, without any beak at all (fig. 32 m). At present, I distinguish this as *A. Moseleyi* nov. spec. Further material is required to decide whether it is better to bring it to *A. crassipes*.

Area of distribution: Endemic in Masafuera.

Robinsonia DC.

DECANDOLLE, Prodr. VI, established three sections: Symphyochaeta *(R. macrocephala),* Eleutherochaeta *(R. Gayana* and *thurifera)* and Eleutherolepis *(R. gracilis).* In several respects *R. macrocephala* differs so much from the other species that the most modern taxonomists would reserve the name *Robinsonia* for this species alone. According to my opinion, we loose more than we gain by splitting up an isolated genus like this, the species of which are, without the slightest doubt, genetically related to each other but lacking closer connection with all other genera. That, in many orders, apparently small characters must be, and have always been, used to distinguish the genera, is one thing; but to make this a rule is wrong: this mechanical and spiritless splitting-up process may, perhaps, satisfy the ambition of the authors of all these »new genera» but it has become a burden to all other botanists. Thus, I retain *Robinsonia* in its old sense, distinguishing two subgenera, Symphyochaeta, comprising *R. macrocephala,* and Eleutherochaeta to receive all the other species, which have free pappus setae and deciduous corolla. I propose to subdivide the latter subgenus into two sections, Symphyolepis with soldered *(R. Gayana* and *thurifera)* and Eleutherolepis with free involucral scales *(R. evenia, Masafuerae, gracilis).* There are some other differences between these sections. In Symphyolepis the base of the pappus forms a conspicuous coronula and the style of the ♂ flowers is shortly bifid with acute penicillate branches; in Eleutherolepis the pappus setae are free almost to their very base, and the style is deeply bifid with linear-truncate branches. Of the three species

of this section *R. gracilis* differs from the others by its small, narrow leaves and less constricted involucre with obsolete calyculus. Habitually, it is equally distant from all the other species.

Key to the genus Robinsonia.

I. Pappus of ♀ flower forming a tube, including the persistent corolla. Leaves with a very dense net of small pellucid venules between the nerves.
Subg. I. **Symphyochaeta** (DC.) Skottsb. *R. macrocephala* Dcne.

II. Pappus bristles free, caducous as also the corolla. Leaves with a much coarser net of veins. ..... Subg. II. **Eleutherochaeta** (DC.) Skottsb.

A. Involucral scales soldered. Leaves distinctly acuminate.
Sect. 1. Symphyolepis Skottsb.

1. Scales cohaerent almost to their tips. Inflorescence rounded—flat. Leaves c. 12 cm long, with numerous lateral veins almost parallel with the midrib..... *R. Gayana* Dcne.
2. Scales cohaerent to $^{2}/_{3}$. Inflorescence pyramidal. Leaves c. 20 cm long with lateral veins forming a conspicuous net with large meshes. *R. thurifera* Dcne.

B. Scales free. Leaves acute, but not distinctly acuminate.
Sect. 2. Eleutherolepis DC.

1. Calyculus conspicuous. Leaves 8—15 cm long.
   a. Leaves fleshy with thick base, leaving semilunar, flat scars. *R. evenia* Phil.
   b. Leaves coriaceous with less thickened base, leaving linear, prominent scars. ..... *R. Masafuerae* Skottsb.
2. Calyculus indistinct. Leaves about 3 cm long. *R. gracilis* Dcne.

125. **R. macrocephala** Dcne. — JOHOW, Estud. 57. — Fig. 33 a—c.

Masatierra: Pto Frances, Loma Incienso (called thus after the Robinsonia), c. 360 m, scattered specimens (past fl.-fr. $^{13}/_{12}$ 16, no. 131, also observed by JOHOW); hills between Pto Frances and Rabanal (JOHOW); Co Centinela, steep slope near the entrance to El Pangal, some few shrubs c. 300 m (fr. $^{28}/_{3}$ 17, no. 573).

The pappus of this species is quite unique, forming a closed, tough and firm tube with a wrinkled surface. The achenes, glabrous in other species, are setose in this. The calyculus consists of few, minute bracts. The involucre in the ♀ measures 10—12 mm in length by 8—9 across; the head is about 15 mm long and 10 mm broad. The scales number 17 or 18 and are firmly soldered. The ray florets are 5 to 8, but sometimes only 2 or 3, sometimes none at all, according to JOHOW. They are about 10 mm long; the ligule is atropurpureous, boat-shaped, 2×1 mm, not smaller than in other species in contrary to older statements. The disc florets are yellow with reddish lobes, 8—8,5 mm long including the ovary. When the fruit is ripe, the involucre bursts open in a quite irregular fashion. The achenes are much larger than in other species, 7—8 mm.

Unfortunately, the flowers of the few male plants seen were all gone already on the 13th of December, so they remain unknown. There were only few female heads still in flower and even these fairly advanced. DECAISNE, Ann. sc. nat. I. 28 writes: »Vidi specim. unicum in herb. Mus. Paris, a Claudio Gay relatum. Floret Januario. Fructum perfecit Februario». GAY visited Masatierra in February (JOHOW l. c. 38). His specimens are in fruit, and I do not think they flowered in January, as every specimen seen by us must have flowered already in November. According to JOHOW, only GAY and himself ever collected this species, but in DC. Prodr. VI. 448 we find the following statement: »leg. cl. LARRAIN et CLAUD. GAY»; comp. above, foot-note on p. 176.

Area of distribution: Endemic in Masatierra.

126. **R. Gayana** Dcne. — JOHOW, Estud. 58; SKOTTSBERG, Stud. Taf. 5, Fig. 1. — Fig. 33 h—k, 35 d—e.

Masatierra: Common on all the ridges from Pto Frances to Co Chumacera; abundant in the higher parts where it forms a conspicuous feature in the vegetation of the rocky crests; occasionally found at lower altitudes (280 m on the north, 190 on the south side of the island). — Fl. Dec. 1916, nos. 22 and 1232 ♂, 23, 84 and 137 ♀; fr. April 1917, no. 23 b.

Male plant: Heads less numerous than in ♀, 8—9 mm high, with fully expanded rays up to 12 mm across (larger than the female, contrary to the statement of JOHOW); involucre 5—6 × 4,5—5 mm; flowers yellow, ray florets generally 8, 6—7 mm long, ligules almost plane, 3,5—4 × 2—2,5 mm, style slightly bifid with short triangulate, acute lobes; disc florets 6—7 mm long, lobes of style incrassate, conical, abruptly narrowed with apiculate tips.

Female plant: Heads as many as 100 in the corymb, 5—6 mm high by 4,5—5 across; involucre 4—4,5 mm in length and width; flowers greenish yellow, 7—8 ray florets 5 mm long, ligule ± erect, boat-shaped, ± bifid; disc florets 4 mm long not counting the exserted style, which is thick with small lobes. Achenes 2—2,5 mm long, those of the ray florets shorter and more curved. Both sexes with very few and small calycular bracts.

Area of distribution: Endemic in Masatierra.

127. **R. thurifera** Dcne. — JOHOW, Estud. 59. — Fig. 33 d—g, 35 a, f, g.

Masatierra: BERTERO! SÖHRENS! — On the ridges, among shrubs and small trees, rare. C. Chifladores, one specimen 350 m, numerous about 450 m (past fl. $^{17}/_{4}$ 17, no. 619 ♀, 620 ♂). Portezuelo de Villagra (also observed by SÖHRENS), south-west slope of Co Pirámide, 575—600 m, about 20 trees seen (fl. $^{31}/_{1}$ 17, no. 358 ♀, 367 ♂): one plant epiphytic on *Blechnum cycadifolium*.

DECAISNE's description refers to the female plant only, and the specimen brought by SÖHRENS is also female. Apparently the male plant is described below for the first time.

Heads less numerous than in ♀, where there are several hundred in one panicle, 7 mm high, 10 mm across; involucre 4,5—5 by 3,5—4 mm, cylindric-campanulate, of about 13 scales, united to above the middle, glabrous with rather abrupt, penicillate apex. Ray florets generally 5 (sometimes 6), 7 mm long, ligule dirty yellow, 4 × 2 mm, tridentate, a little fleshy; style long exserted,

lobes ovate with penicillate apex. Disc florets 5 mm long, not counting the exserted stamens, yellowish green; stamens distinctly thickened below the anther, style a little exserted with orbicular-triangulate, slightly divergent stigmas, their tips penicillate. Pappus composed of very few bristles.

The following notes complete the earlier short descriptions of the female plant. Head 4 mm high and 4,5 across, involucre only 3 × 3 mm, smaller than in all the other species, with few inconspicuous calycular bracts. Ray florets generally 8, sometimes as few as 5, yellowish green, only 3—3,2 mm long with a small (1,5 × 0,7 mm), boat-shaped ligule; style thick with short lobes, yellowish green; disc florets of the same colour, 3 mm long, not counting the exserted style; stigmas short, divergent. Achenes 10-costate acc. to DECAISNE, 5—10-costate acc. to JOHOW; I found them 5—8-costate, ribs little prominent and not equidistant. The achene is crowned by a narrow ring much less conspicuous than in *R. Gayana*. On most of the achenes examined there are one or more thick, white stripes, which proved to be composed of the resin exuded on the stem of this and other Robinsonias, but not met with on the achene in any other species. These clumps of resin were observed by DECAISNE, l. c. 24: »le R. thurifera a ses fruits munis de côtes très saillantes et formées par une substance médullaire blanchâtre». The marginal achenes are shorter (1,5 mm long) and more curved than those of the centre, where they are 2 mm long, a difference also noted in *R. Gayana*. There are only 5 to 10 bristles, while, in all the congeners, they are much more numerous.

Area of distribution: Endemic in Masatierra.

128. **R. evenia** Phil. — JOHOW, Estud. 60. — Fig. 33 l—o, 34 b, 35 b.

Masatierra: GERMAIN! REED! DOWNTON! MOSELEY!, all without locality. — Not uncommon in the eastern and central parts, along the higher ridges, at the limit of the forest among brushwood, or in the humid, *Dicksonia*-rich woods. — C. Chifladores, one large, apparently not epiphytic specimen at 350 m, many in the forest 500 m, all epiphytic; between Q. de la Piedra Agujereada and Q. Laura, c. 500 m, on *Dicksonia,* abundant; C. Centinela, 560 m, on *Dicksonia,* abundant; the depression between Co Damajuana and Co Yunque, 580 m, on *Thyrsopteris;* V. Colonial, C. Central, 570 m, on *Dicksonia;* Portezuelo de Villagra, among shrubs c. 600 m, several trees, all growing on tree-ferns (fl. ♂ $^{3}/_{2}$ 16, no. 25); C. Salsipuedes, in *Dicksonia*-grove, 670 m, seedlings (no. 74) and adult plants, all epiphytic (fl. $^{13}/_{1}$ 17, no. 82 ♀, 83 ♂); dense forest on a mountan spur west of Co Yunque, c. 500 m, epiphytic; Q. Villagra, c. 500 m, on *Dicksonia.*

Curiously enough it is nowhere stated that *R. evenia* is an epiphyte. It grows on the trunks of tree-ferns; only in one single case a large and old specimen was found growing on the ground, but I am inclined to believe that also this had germinated on the base of a fern tree, sending, as it often does, roots into the soil, and that the original substratum had disappeared. The seedling has fleshy, densly pilose, coarsely serrate leaves. Even the old, perfectly glabrous leaves are much more fleshy than in other species, a circumstance perhaps connected with the epiphytic life; they are as much as 1 mm thick (not counting the midrib), and the veins are hardly visible.

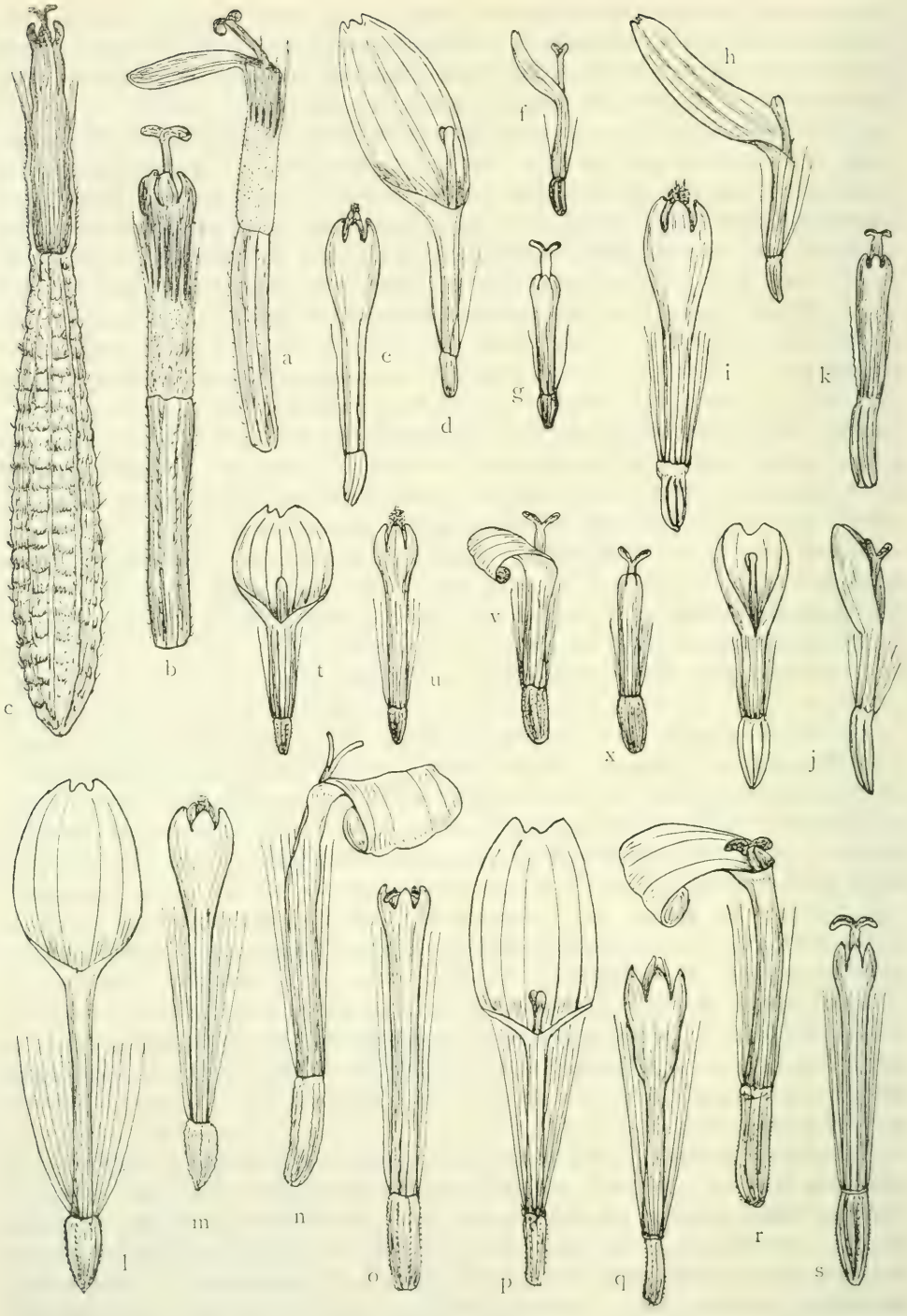


Fig. 33. Flowers of *Robinsonia*. **a**—**c** *R. macrocephala* ♀: **a** ray, **b** disc floret, **c** achene. **d**—**g** *R. thurifera:* **d** ray, **e** disc floret of ♂, **f** ray, **g** disc floret of ♀. **h**—**k** *R. Gayana:* **h** ray and **i** disc floret of ♂, **j** ray, **k** disc floret of ♀. **l**—**o** *R. evenia:* **l** ray, **m** disc floret of ♂, **n** ray, **o** disc floret of ♀. **p**—**s** *R. Masafuerae:* **p** ray, **q** disc floret of ♂, **r** ray, **s** disc floret of ♀. **t**—**x** *R. gracilis:* **t** ray, **u** disc floret of ♂, **v** ray, **x** disc floret of ♀. — All × 8.

Male plant: Head 8 mm high, 10—12, rarely as much as 15 mm across. Involucre of about 13 scales, 6—7 × 4—4,5 mm, campanulate, with 5 or 6 small calycular bracts. Ray florets 8, pure yellow, 8—10 mm long; ligule tridentate, 3,2—4 × 2,5 mm; style hardly exserted, bifid; pappus rays numerous (25—30) in all kinds of flowers. Disc florets greenish yellow, 6—7 mm long; style deeply bifid with truncate branches.

Female plant: Head about 10 mm high, 7—8 across; involucre cylindrical, 7—8 × 5 mm; ray florets 8, yellow, 7—8 mm long; ligule 2,5 × 2 mm; style greenish, deeply bifid; disc florets 6 mm long, yellow with greenish, barely exserted style. Young achenes slightly costate with pilose costae.

Area of distribution: Endemic in Masatierra.

*129. **R. Masafuerae** nov. spec. — Plate 17, fig 1; text fig. 33 p—s, 34 a, 35 c, k, i.

Arbuscula dioeca ad 2 m alta, trunco primario certe ad 7 cm crasso, pseudodichotome-subumbellatim ramosa, ramis junioribus viridibus, cicatricibus linearibus foliorum manifeste notatis. Folia ad apicem ramorum more generis conferta, crassiuscula, subcoriacea, dilute viridia, glaberrima, lanceolata—anguste obovato-lanceolata, in apicem acutum sensim angustata, versus basin valde contracta, margine in parte dimidia superiore minute denticulata, nervo mediano utrinque conspicuo, basi latissimo, secundariis indistinctis, angulo acuto exeuntibus, plerumque 7—12 cm longa et 1,5—2 cm lata, sed magnitudo summopere variabilis (folia ad 18,2 × 4,7 cm visa, in specimine sylvicola unico invento ad 22 × 3,5 cm). Inflorescentia terminalis valde ramosa corymbosa, bracteis sat parvis instructa; pedicelli capitulorum 1—2 cm longi, superne pilosi. Capitula ♂ 7 mm alta et 10 mm crassa; involucrum campanulatum, 5 mm altum et 4 mm latum, addito calyculo a bracteis perpaucis angustis ad 2 mm longis formato. Squamae circ. 12, 5 mm longae et 1,5 mm latae, glabrae vel dorso pilis nonnullis inspersae, apice penicillatae, crassae, margine scariosae, liberae sed manifeste imbricatae. Flores ligulati 8, flavi, 8 mm longi, ligula 3—3,5 × 2 mm, irregulariter tridentata, in tubum abrupte angustata, stylo breviter bifido paulo exserto. Flores disci 6 mm longi, viridi-lutei, antheris flavis; stylus inclusus apice bifidus ramis truncatis penicillatis. Pappus multiradiatus. Capitula ♀ magis numerosa certe ad 75, 8 mm alta et 7 mm lata; involucrum cylindrico-campanulatum, sub apice constrictum, basi truncatum et pilosiusculum, 6—7 mm altum basi 4—5 mm

Fig. 34. Leaves of a *Robinsonia Masafuerae*, b *R. evenia*. Nat. size.

latum, calyculo conspicuo e bracteis 5—6 (vel ultra) ad 4 mm longis formato. Squamae ad 14, ut in ♂, sed magis adpressae et conspicue longiores. Flores ligulati 8, flavi, 8 mm longi, ligula 2,2—2,5 mm longa et 1,5—2 mm lata, subtridentata; stylus exsertus ramis patentibus. Flores disci viridescentes, 6 mm longi, staminodiis minutis, stylo exserto ut in praecedente. Achaenia fusiformia, fusca, 9—10-costata, c. 2,2 mm longa; pappus setis circ. 25 basi annulum minutum formantibus.

Masafuera: On the high ridges, generally growing in the fernbeds, often much damaged by the goats, which had killed a great many specimens. — Edge of western precipice, above Buque Varado, c. 1250 m; near the Correspondencia camp, 1130 m (fl.-past fl. $^{15}/_{2}$ 17, no. 434 ♀, no. 1233 ♂); Las Torres, 1370 m, rare; C. Atravesado, 1350 m, one small tree; C. del Barril, c. 750 m; Los Inocentes, 740—950 m, among *Dicksonia*, also seen growing on the trunk of this; slopes of Q. Varadero, c. 650 m. One aberrant sterile plant was observed in Q. de las Chozas in dense forest, with long, thin leaves (no. 374); one seedling was found in the Casas canyon.

Of special interest as the first *Robinsonia* reported from Masafuera. It is very near *R. evenia*, but as a rule not epiphytic and differing in many respects. The leaves (fig. 34) have a broader midrib and are more narrowed towards the base, the base is less incrassate and the scars left linear, not triangular or semilunar as in *evenia*. The female head is a trifle smaller and has a more conspicuous calyculus. The details of the flowers show some differences, as seen from my illustrations.

Area of distribution: Endemic in Masafuera.

130. **R. gracilis** Dcne. — JOHOW, Estud. 61. — Fig. 33 t—x, 35 h.

Masatierra: In the shrubberies of the ridges, not seen at a lower altitude than 530 m, scarce. Between Q. de la Piedra Agujereada and Q. Laura, robust specimens; C. Centinela (also observed by JOHOW), 530 m, forming small thickets and exceptionally well developed (fr. $^{28}/_{3}$ 17, no. 577); crest of the island above Pangal, c. 800 m, very scarce; V. Colonial, C. Central, c. 570 m, solitary; Portezuelo de Villagra, one ♂ plant near the SELKIRK memorial (buds $^{3}/_{12}$, beg. fl. $^{14}/_{12}$ 16, no. 24), and a few ♀ plants, one of which grew on *Blechnum cycadifolium* (fl. $^{25}/_{12}$ 16, no. 195), C. Salsipuedes, 730—750 m, solitary (beg. fl. $^{8}/_{12}$ 16, no. 78 ♂, 81 ♀).

JOHOW writes l. c. »lígulas numerosas i mucho mas largas que en las demás especies». HEMSLEY's figure of a male plant shows 8—10 ligules (pl. 55). My observations, made on abundant living material, are not in accordance with JOHOW's statements.

Inflorescence comparatively small, only containing 20—25 heads. Calyculus of few, minute bracts. Involucre 4 mm high and 4 mm across, little exceeded by the florets, of about 12 scales, firmly pressed together in ♀, much less so in ♂. The male head is 7—8 mm across, the ray florets generally 8, bright yellow, 5 mm long; ligules 2,5 × 2 mm, 2—3-dentate. Style slightly bifid with erect branches. Disc florets yellow, 4 mm long, style deeply bifid with truncate branches, hardly reaching the full length of the stamens.

The female head is 4 mm across; ray florets 8, yellow, 4 mm long with small ligule (c. 1 × 0,9 mm), 2—3-dentate. Disc florets cylindric, yellowish green, 3,2 mm long, with exserted bifid-truncate style and minute staminodes. The achenes are 1,2 mm long, costate, glabrous according to JOHOW, but minutely scabrid.

Area of distribution: Endemic in Masatierra.

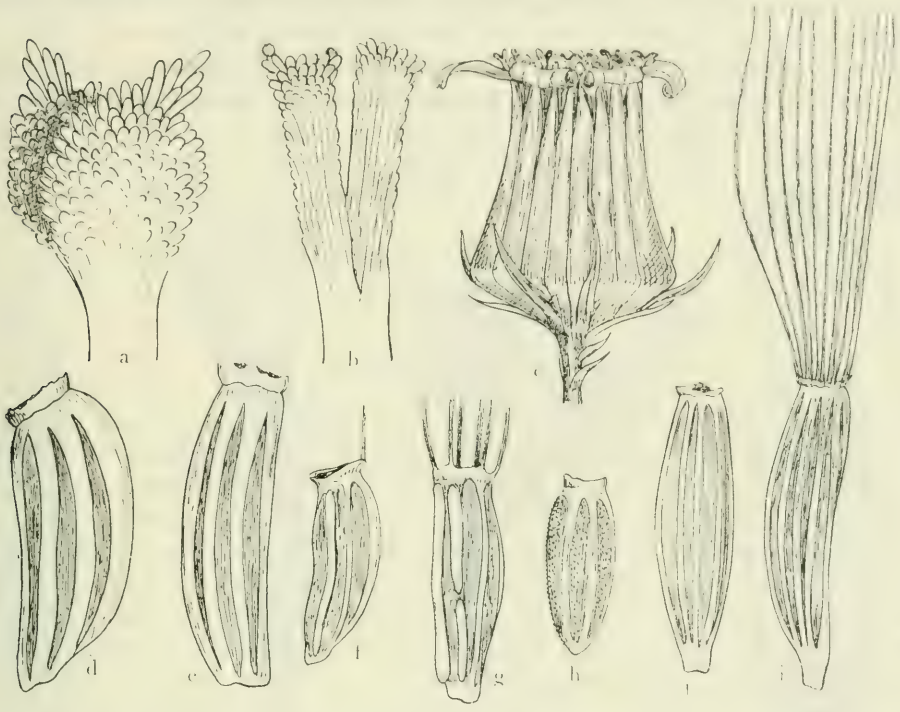


Fig 35. a—b tip of style in male disc florets, a of *R. thurifera*, b of *R. evenia*, × 50. c ♀ head of *R. Masafuerae*, × 5. d—i achenes: d—e *R. Gayana*, ray (d) and disc (e); f—g *R. thurifera*, ray (f) and disc (g); h *R. gracilis* (disc); k—i *R. Masafuerae*, disc (k) and ray (i). d—i × 17.

Rhetinodendron Meisn.

131. **R. Berterii** (Dcne) Hemsl. — JOHOW, Estud. 55. — Fig. 36.

Masatierra: in the high parts of the central section, generally in open, low forest, rarely observed below 500 m, scarce. — El Rabanal (JOHOW); the depression between Co Damajuana and Co Yunque, 540 m; V. Colonial, C. Central (also observed by JOHOW), on both sides of the crest, 535—570 m, many specimens (past fl. ♀ $^{18}/_{1}$ 17, no. 301); Portezuelo de Villagra, a few trees on a rock ledge, c. 600 m (beg. fl. $^{14}/_{12}$ 16, no. 134 ♂, 135 ♀); Q. Seca, in the forest, one seedling; C. Salsipuedes (also observed by JOHOW); highest part of Q. Salsipuedes, rare (fl. ♂ $^{20}/_{12}$ 16, no. 173) ridge west of Co Yunque, c. 530 m; Q. Villagra, in the forest c. 500 m, solitary (also observed by JOHOW); south slope of Co Chumacera (fl. ♀ $^{6}/_{1}$ 17, no. 253).

According to JOHOW, *Rhetinodendron* generally is an epiphyte, and later

authors have repeated this statement, adding their own reflections. I shall return to this question when dealing with my ecological observations: at present it suffices to tell that, in spite of the very special attention paid to this plant, of which I have seen much more than earlier visitors, I have been unable to discover a single case where an adult specimen was epiphytic. Once, two seedlings were observed on *Thyrsopteris,* but seedlings of Robinsonias as well as of *Dendroseris micrantha* are often found growing on the trunks of arboreous ferns.

The structure of the head in *Rhetinodendron* is interesting and will be described with full details later; this time I only refer to my figures. The pap-

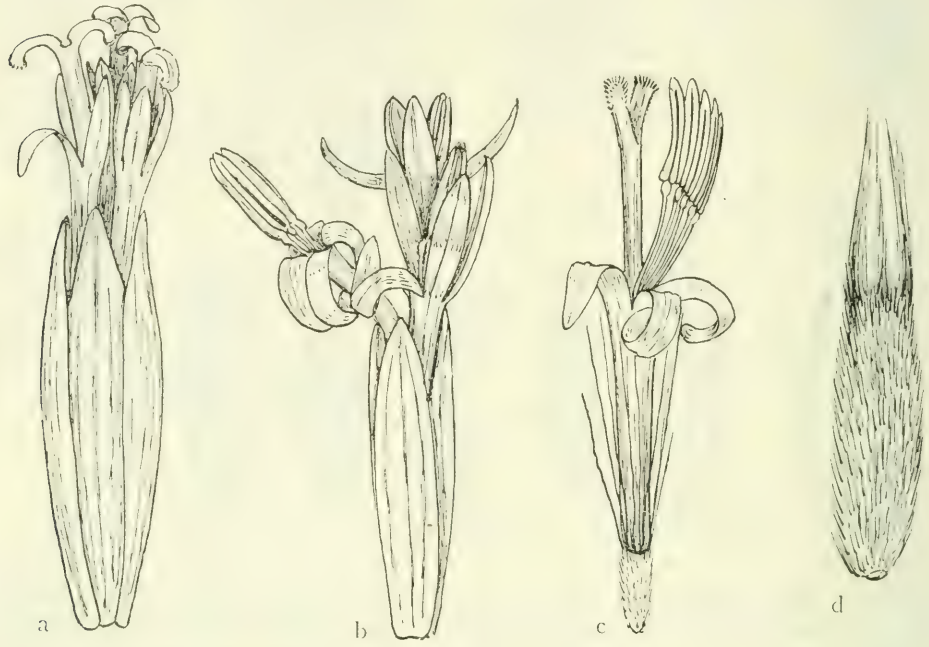


Fig. 36. *Rhetinodendron Berterii:* a ♀ head, b ♂ head, c ♂ flower, d achene — All × 8.

pus is peculiar, for it forms four different portions, two larger lateral and two smaller, dorsal and ventral; the achene is flattened in tangential direction.

Area of distribution: Endemic in Masatierra; monotypic.

Centaurodendron Johow.

132. **C. dracaenoides** Joh., Estud. 63; SKOTTSBERG, Stud. 5, Taf. 5, Fig. 2—3.

Masatierra: only on the high ridges encircling Cumberland Bay, very rare. Forest on the very steep slope of Co Damajuana, one specimen seen; Portezuelo de Villagra, three specimens near the path just below the pass, c. 550 m, three more seen on the slope of Co Pirámide close to the pass, 580 m (no. 1234); northwest face of the same mountain, on rock ledges, several trees.

The first who collected *Centaurodendron* was not JOHOW, but BERTERO; still, B. did not discover it. Under the name of *Dendroseris micrantha*, BERTERO no. 1602! (Herb. Kew) there is one sheet with pieces of an old inflorescence of the latter together with a leaf of *Centaurodendron*.

JOHOW discovered this in July, 1892, and found it again in June, 1895; to judge from a specimen in his herbarium it was also gathered by SÖHRENS, probably in April, 1895, on the same occasion when S. found *Robinsonia thurifera*, for it lies together with this under the same name. I rediscovered it in August, 1908, and found the old inflorescence, just as JOHOW did, but there was no trace of new ones. From this I concluded that it flowers late in the summer or even in the autumn, and I expected to get flowers this time, but was cruelly deceived. For all I could do was to state that in certain years not a single specimen produces flowers, and that the year 1916—17 was one of them.

Area of distribution: Endemic in Masatierra; monotypic.

Dendroseris D. Don.

The type of the genus is *D. macrophylla* D. Don, Phil. Mag. XI (1832) 388, collected in Masafuera by CUMING (Herb. Kew!). One year later DECAISNE, in Arch. de Bot. I (1833) 513, described the genus *Rea* Bert. ms., with the following species: *R. macrantha* Bert. et Dcne (Masatierra), *Berteriana* Dcne (Masatierra), *pinnata* Bert. et Dcne (Masatierra), *neriifolia* Dcne (Masatierra), *micrantha* Bert. et Dcne (Masatierra), *marginata* Bert. et Dcne (Masatierra: Portezuelo), *mollis* Bert. et Dcne (Masatierra: Portezuelo). In Comp. Bot. Mag. I. 32 HOOKER and ARNOTT reduced *Rea* to *Dendroseris*, listing the following species: *D. macrophylla* (with R. macrantha as syn.), *Berteriana, pinnata, neriifolia, micrantha, marginata* and *mollis*.

JOHOW, Estud., reduced these seven species to four, declaring *D. Berteriana* identical with *pinnata* and *marginata* with *macrophylla* and rejecting *D. mollis* altogether. Of this, only the leaves, described as »subincano-velutina» — glabrous in all the others — are known. There is no specimen in Kew, nor in Paris, and I have not been able to discover the type. JOHOW guessed that a stout specimen of *Gnaphalium citrinum* (= cheiranthifolium) or some other similar plant was mistaken for *Dendroseris*. This is hardly probable. In the locality given, Portezuelo, nothing like it is found, unless a young *Robinsonia* or *Rhetinodendron* was mistaken for a *Dendroseris*. With regard to BERTERO's ability as an observer, this is difficult to believe.

The treatment of *Dendroseris* in JOHOW's flora is not quite satisfactory; still, he is not to blame. He had no opportunity to see BERTERO's types, his own material was scarce; further, when HOOKER and ARNOTT reduced *Rea macrantha* to *D. macrophylla* they indicated the wrong course later followed by GAY and JOHOW. HEMSLEY pointed out the validity of *D. marginata*, but JOHOW brought this to *macrophylla*. He was equally critical against his own discoveries, for the peculiar *micrantha* from the coast rocks was only with hesitation classified even as a variety, v. *pruinata*. In the case of *D. Berteriana*,

JOHOW based his opinion on BERTERO himself, who was inclined to regard it as a noticeable form of *pinnata*. While I regard *pruinata* as a species, I follow JOHOW with respect to *Berteriana*. Finally, JOHOW added one new species, *D. gigantea*, which has remained very little known until now.

Returning to *D. macrophylla*, it is evident that *Rea macrantha* is different from this. Both have incised leaves, but their shape is not the same and there are many differences in the flower and fruit. *D. macrophylla* is endemic in Masafuera, *macrantha* in Masatierra. *Rea marginata* is certainly distinct from both, not only in the leaves, which are entire, but also in flower and fruit, described here for the first time. Finally, var. *marginata* of JOHOW, at home on the coast rocks, is distinct from the true *marginata* and will receive the new name *D. litoralis*. Thus, *D. macrophylla* in JOHOW's sense includes four species, one from Masafuera, two confined to Masatierra and one to a rock off Masatierra and to Santa Clara.

These four species differ from the rest in many respects. The stem is branched, hollow with numerous diaphragms, the receptacle is also hollow, its surface plane, with numerous fibrils round the points of insertion of the achenes. The head is very large, the flowers bright orange, the achenes distinctly winged, the pappus formed by short, irregular, ± rufous bristles. I am pretty sure that the »splitting-up school» would reserve the name *Dendroseris* for these four species. My reasons for not doing so were explained under *Robinsonia*. The remaining species have creamy white flowers and unvinged, obovoid, slightly compressed achenes; here the accordance between them ends, and they belong to two rather different types. In *D. pinnata* and *D. regia* (nov. spec.) the stem is simple, but otherwise as in *D. macrophylla;* the receptacle (unknown in *D. regia*) is hollow, but concave and only slightly fibrillose. The remaining species *(D. micrantha, pruinata, neriifolia* and *gigantea)* have a branched and solid stem, and a solid, concave and naked receptacle. *D. pinnata* and *regia* are intermediate between the *macrophylla*-type and the *micrantha*-type. Either, we should retain *Dendroseris* in the old sense, or three genera must be recognized. Further, *D. gigantea* differs from all its congeners in the shape of the corolla. In view of these circumstances I propose to subdivide the genus in the following manner.

I. Stem branched, hollow. Head 3—5 cm wide; receptacle fibrillose; flowers orange yellow; achenes winged. ..... Subgen. I. **Eudendroseris** Skottsb.
   A. Leaves chartaceous, grossly dentate-lobate.
      1. Leaves oblong-ovate, ± regularly lobate. Anthers dark. Achenes mostly broader than long. Cotyledons entire.
         D. macrantha (Bert. et Dcne) Skottsb.
      2. Leaves often as broad as long, irregularly lobate-serrate. Anthers yellow. Achenes twice as long as broad. Cotyledons trilobate.
         D. macrophylla D. Don.
   B. Leaves coriaceous, entire.
      1. Anthers dark. Achenes thick.
         D. marginata (Bert. et Dcne) Hook. et Arn.
      2. Anthers yellow. Achenes very flat. ..... *D. litoralis* Skottsb.

II. Head smaller. Flowers whitish. Achenes not winged.
A. Stem simple, hollow. Receptacle fibrillose. Leaves pinnate.
Subgen. II. **Phoenicoseris** Skottsb.
1. Pinnae deeply bifurcate with linear segments.
D. pinnata (Bert. et Dcne) Hook. et Arn.
2. Pinnae ± ovate, dentate.
a. Petiole winged, but not auriculate.
D. pinnata var. insignis (Bert.).
b. Petiole auriculate. ..... *D. regia* Skottsb.
B. Stem branched, solid. Receptacle naked. Leaves entire.
Subgen. III. **Rea** (Bert. ex p.) Skottsb.
1. Leaf-margin minutely denticulate or entire. Ligule 5-dentate.
Sect. 1. *Eurea* Skottsb.
a. Leaves petiolate. Involucre funnel-shaped, c. 5 mm high.
+. Leaves coriaceous, narrow lanceolate.
D. neriifolia (Dcne) Hook. et Arn.
++. Leaves chartaceous, ovate-lanceolate.
D. micrantha (Bert. et Dcne) Hook. et Arn.
b. Leaves sessile. Involucre campanulate, c. 10 mm high.
D. pruinata (Joh.) Skottsb.
2. Leaves densely dentate-serrate, very thin. Ligules deeply 5-cleft.
Sect. 2. *Schizoglossum* Skottsb. *D. gigantea* Joh.

BENTHAM and HOOKER FIL., Gen. plant. II. 219, describe the achene of the Dendroseriidae in the following terms: »Achaenia a dorso compressa subtrigona v. 2—3-alata». This description fits the genus *Fitchia,* a genus not very near *Dendroseris.* The achene of *Thamnoseris* is unknown. The marginal achenes of *Dendroseris* are more or less compressed from the back, triangular in section, with two lateral and sometimes also with a ventral wing in *Eudendroseris.* But all the other achaenia in the head are compressed from the sides, and their wings in *Eudendroseris* are dorsal and ventral only. This dimorphism clearly stands in relation with the different position in the head. It is illustrated below, fig. 37.

133. **D. macrophylla** D. Don. — JOHOW, Estud. 70 p. p. min. — Fig. 37 a, m.

Masafuera: CUMING! DOWNTON! — On the walls of the canyons, also higher up on the ridges and on the top of the lofty coast cliffs in some places, scattered. Ravines above Q. Sanchez, solitary specimens; Q. de las Casas, rock ledges (fl. $^{23}/_{2}$ 17, no. 362; also observed by JOHOW); Q. de las Vacas (also JOHOW); Q. Inocentes, some large trees on the cliffs c. 500 m; Q. Angosta, in the narrow gorge; Rodado del Sándalo, on the top of the cliff; Q. de la Lobería, some fine trees, c. 250 m.

There is a good illustration of this species in CURTIS, Bot. Mag. t. 6353. The specimens growing in the fissures on the canyon walls are small and seldom more than 2 or 3 m high; in more suitable places there are much larger ones, at least 5 or 6 m high and with a trunk 15 or perhaps 20 cm thick, so

that *D. macrophylla* surpasses all the other species of *Eudendroseris* in size and beauty. It differs from these in several respects. The leaves are thinner, papyraceous when dry, pure dark green. Their shape is variable. The large rosulate leaves measure about 30—35 × 26—28 cm; they are broad ovate with cordate base, ± acuminate, grossly and irregularly dentate with triangular, callose teeth. The petiole attains a length of 20 cm; it is canaliculate, winged, but comparatively slender. Other rosette leaves are orbicular in outline or even broader than long (18 cm long and 23 cm broad in one of my specimens), cordate, deeply inciso-lobate, at least in their lower half, with linear-triangular segments. The inflorescence is composed of few but very large heads on long pedicels; the lower supporting leaves are petiolate, subpinnate or sinuate, the uppermost sessile, entire, auriculate. The corolla is c. 45 mm long, the ligule 3,5 mm across. The anthers are yellow. The style is yellow, with 3 mm long branches. The achenes (only few mature ones seen) are 5—6 mm long, brown, striate, the base narrow. In the marginal ones only the ventral wing is distinct, the lateral wings being poorly developed. Embryo with very short radicle and trilobate cotyledons.

Area of distribution: Endemic in Masafuera.

134. **D. macrantha** (Bert. et Dcne) Skottsb. — JOHOW, Estud. 70 sub *D. macrophylla*. — Fig. 37 b—d, n.

Masatierra: BERTERO no. 1600! — Portezuelo de Villagra, on the southwest side of the pass (also observed by JOHOW), c. 580 m, two small specimens seen (beg. fl. $^{31}/_{1}$ 17, no. 330).

BERTERO describes this as a tree 8 to 15 feet high and found in the shady woods of the high mountains. His specimens probably came from Portezuelo, as they bear no. 1600, for no. 1601, *D. marginata*, is collected in this locality. To judge from BERTERO's words, it seems he saw *D. macrantha* in more than one locality. In spite of a diligent search, we only found the two dwarf trees mentioned above, growing almost concealed among dense shrubs of *Pernettya*, etc.

D. macrantha differs from *macrophylla* in many respects. The leaves are oblong, about twice as long as broad (large blades 25—30 cm long by 13—14 wide), firmer than in the latter, shorter petiolate (6—7 cm), narrow cordate at base but hardly decurrent, coarsely and regularly dentate-lobate; upper leaves decurrent on the petiole, subentire or entire, uppermost sessile, auriculate. Heads more numerous than in *macrophylla*. Flowers numerous, corollas as in *D. macrophylla*, 35—40 mm long; anthers lilac brown; connective tip yellow with numerous low, dark papillae, not found in other species. Style darker than in *macrophylla*. Achenes quite different, broader than long (3,5—4 by 4,5—6 mm), obscurely wrinkled, with narrow but distinct wings. Embryo 3—3,5 mm long; cotyledons entire, broader than long.

Area of distribution: Endemic in Masatierra.

135. **D. marginata** (Bert. et Dcne) Hook. et Arn. — JOHOW, Estud. 70 sub *D. macrophylla;* var. *marginata* Joh. ex REICHE, Flora de Chile V. 5. — Plate 18; Plate 20, fig. 11; text fig. 37 e—i, o.

Masatierra: Portezuelo de Villagra (BERTERO no. 1601!), on the northeast precipice of Co Pirámide, rock ledge, c. 625 m (fl.-fr. $^{3}/_{12}$ 16, no. 3). Most likely the plants observed on the face of Co Damajuana, c. 530 m, and at the back of Q. de la Choza, c. 450 m, in both places quite out of reach, belonged to this species.

JOHOW wanted to explain *D. marginata* as a local form of *macrophylla*, due to external conditions. Both, however, grow in the same place and do not

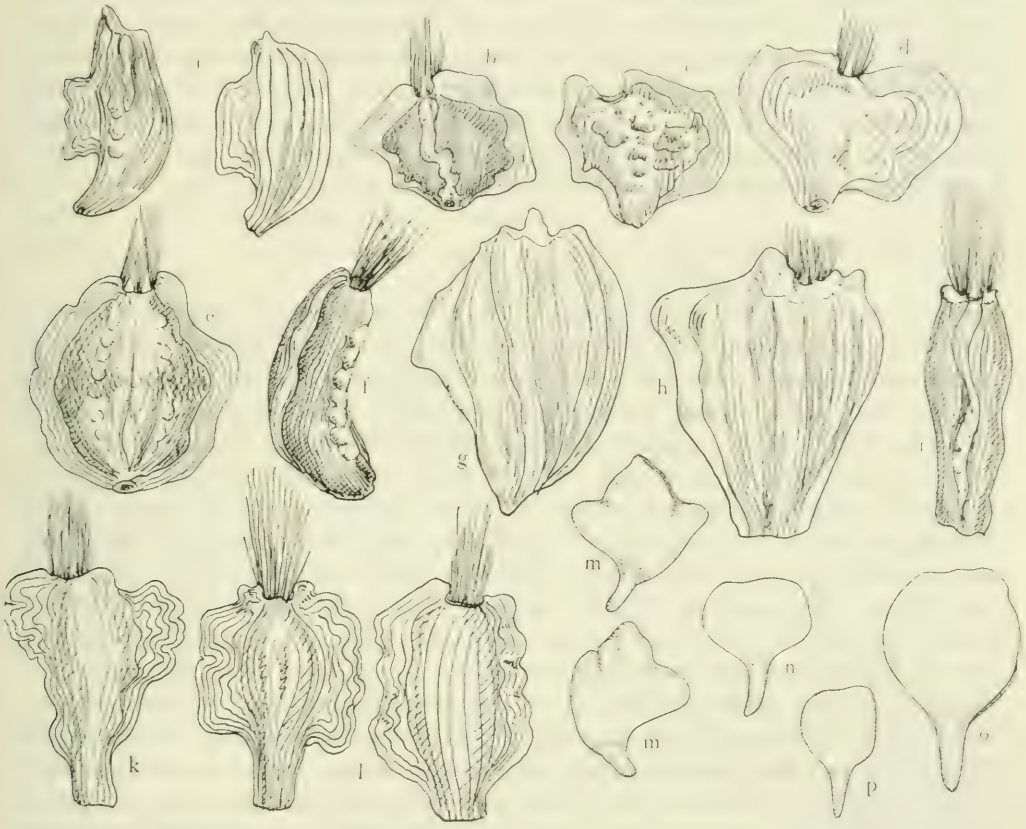


Fig. 37. Achenes (a—l) and embryos (m—p) of *Dendroseris* subgen. *Eudendroseris*. a *D. macrophylla*, two achenes from the side; b—d *D. macrantha:* b marginal achene, ventral view, c—d central achenes, side view; e—i *D. marginata:* e—f marginal achenes, e ventral and f lateral view; g—i central achenes, g—h lateral, i ventral view; k—l *D. litoralis:* k central achene, lateral view and l marginal achenes, dorsal view. m embryos of *D. macrophylla*, n of *D. macrantha*, o of *D. marginata* and p of *D. litoralis*. — All × 5.

only differ in the leaves. BERTERO's specimens were sterile, but another collector, not quoted until now, found the inflorescence (in fruit). A specimen in Herb. Kew labelled »Rea longifolia Phil., Reed oct. 1872», consists of a leaf of *D. micrantha* and a piece of an old inflorescence of *D. marginata*.

The leaves are coriaceous, broad ovate with rounded or acuminate tip and cordate base. They are quite entire, but the edge shows scattered warts, visible on the leaf near the rock in plate 18. The petiole is broadly alate. The upper leaves are sessile as in the former. The (hitherto undescribed)

inflorescence is rather large, more condensed, with numerous heads; these are smaller than in the former and the involucre much more urceolate. The open head in full bloom measures 3,5 cm across; it only contains about 50 florets. The corolla attains a length of 40—42 mm; the whitish tube is soft papillose in the middle part, the deep orange coloured ligule is 3—3,5 mm across. Anthers dark lilac brown with tails considerably longer than the gland of the filament. Style yellowish white below, upwards covered with brown papillae, also on the back and sides of the branches, while their upper surface is clothed with low, light yellow stigma papillae. Branches of the style 4,5 mm long. Achenes larger than in any other species, 7 or even 8 mm, brown, thick, with longitudinal furrows; marginal ones curved with distinct lateral wings and a ventral keel, the others with thick dorsal and ventral wings. Embryo very large, 5—6 mm long, with entire, orbicular cotyledons. Pappus turning dark rufous with age.

Area of distribution: Endemic in Masatierra.

*136. **D. litoralis** nov. spec. — Syn. *D. macrophylla* Joh. ex p. — Plate 19; plate 20, fig. 12; text fig. 37 k—l, p.

Arbuscula 1,5—2 m alta habitu praecedentis sed truncus primarius crassior. Folia ad apicem ramorum pauca dense rosulata; lamina obscure viridis subglaucescens subtus pallidior, coriacea-carnosula, valde nervosa nervis crassis albidis, late ovata, obtusa, cordata, margine laevi ± undulato, ad 25 cm longa et 18 cm lata; petiolus sectione triangularis crassus inferne saltem canaliculatus et marginatus, ad 12 cm longus. Inflorescentia terminalis late paniculata multiceps, foliosa foliis sessilibus amplexicaulibus. Pedunculi 2—4 cm longi. Capitula magna, florida ad 5 cm diam. Involucrum campanato-urceolatum, squamais externis viridi-glaucis ovato-triangulatis acutis, interioribus linearibus subhyalinis penicillatis. Receptaculum fibrillis laceratis usque ad 1 cm longis munitum. Flores numerosi certe ad 100; corolla ad 35mm longa, tubo angusto albido basi excepta molliter papilloso, ligula crocea 3—3,5 mm lata stylo aequilonga vel brevior. Antherae dilute flavae, caudae glandula paulo longiores. Stylus flavescens viridi-papillosus, ramis ad 4 mm longis. Achaenia sordide straminea, illa florum marginalium lateribus alatis ventroque carinato, cetera tenuia lateraliter valde compressa, 5—6 mm longa, basi valde angusta, sat late alata, alis dense ac longitudinaliter striatis. Embryo 3,5—4 mm longus, cotyledonibus integris suborbiculatis radicula paulo longioribus. Pappus sordide stramineus.

Morro Viñillo, a small rock off the south coast of Masatierra (P. ARREDONDO a. o.); cultivated specimens, raised from seeds gathered in Viñillo seen in some of the gardens in Masatierra (plate 19).

Santa Clara: Crevices in the coast cliffs of the main island, and on Morro de los Alelíes (fl.-fr. $^{26}/_{1}$ 17, no. 342). Also observed by JOHOW.

Very near *D. marginata*, but distinct. The leaves are thicker, with smooth edge, the heads larger with twice as many flowers, the anthers and style yellow, the tails of the anthers shorter. The achenes are very different and the embryo considerably smaller. These achenes are mature, for I have raised numerous specimens from the portion collected by me in Santa Clara as well as from others of absolutely identical appearance gathered in the garden of ARREDONDO, who introduced the species from Morro Viñillo. My plants are all of the same

type and agree perfectly well with the herbarium specimens as to the leaves. They are 3—4 years old but have not yet flowered.

Area of distribution: Endemic in Santa Clara and Morro Viñillo.

137. **D. pinnata** (Bert. et Dcne) Hook. et Arn. — JOHOW, Estud. 71.

Masatierra: On the higher ridges, at the limit of the forest, among shrubs and small trees, not uncommon. — Between Q. Laura and Q. de la Piedra Agujereada, c. 600 m, large trees; El Pangal, west branch, c. 400 m, and on the narrow crest above Pangal, c. 800 m; north face of Co Damajuana, 500—530 m; V. Colonial, C. Central (JOHOW), solitary in the forest down to 350 m; Portezuelo de Villagra (JOHOW), scattered on both sides, 5—600 m, one specimen (no. 1235) growing on *Blechnum cycadifolium;* C. Salsipuedes (JOHOW), 600—750 m, scattered in the shrubberies (beg. fl. $^{5}/_{12}$ 16, no. 79 — one single tree, all others sterile); Q. de los Helechos, on *Dicksonia;* between Q. Salsipuedes and Pto Ingles; Pto Ingles, central ridge c. 470 m.

var. **insignis** Bert. ms., Johow. — Syn. *Rea Berteriana* Dcne. — **Masatierra:** Q. de la Piedra Agujereada, in wet forest c. 600 m; in the gap between Damajuana and Yunque, c. 580 m, in the humid forest, no. 164 (BERTERO no. 1505! [type] labelled »El Yunque Majo 1830»; the Kew sheet consists of two leaves and one [complete??] inflorescence, the latter very small).

Regarding *D. Berteriana (insignis)*, the material collected hitherto is very scarce. BERTERO alone has found the flowers, and very late in the season (May). The very few plants seen by us suggested a *pinnata*-form of extreme shade and moisture. A seedling, quite like that of typical *pinnata*, was found with them. The primary leaves are simple but denticulate and reniform.

Area of distribution: Endemic in Masatierra.

*138. **D. regia** nov. spec. — Plate 17, fig. 2; text fig. 38.

Phoenicoseris *D. pinnatae* affinis. Truncus simplex rectus ad 180 cm altus et 13 cm diam. visus, cicatricibus foliorum manifeste notatus, apice rosulam giganteam foliorum circ. 30 cm altam et 1 m latam gerens. Folia plantae juvenilis maxima, ad 150 cm longa et 57 cm lata a me visa, plantae adultae minora, 30—65 cm longa. Lamina crassiuscula, 3—6-pinnata, ambitu late vel latissime ovata, discolor subtus glaucescens, 24—36 cm longa et 16—31 cm lata, praecipue subtus secus nervos ± irregulariter pulverulento-pubescens mox glabra; pinnae laterales sinuato-dentatae, versus basin irregulariter et profunde dentato-laciniatae, flabellatim nervosae; terminalis triangulato-semiorbicularis basi totam latitudinem folii fere occupans, plicata, ± profunde divisa et margine irregulariter dentata, pedato-nervosa; pinnae haud raro valde approximatae sese tegentes; petiolus ad 20 cm longus, crasse carnosus, inferne auriculis membranaceis pulchre reticulato venosis, versus basin angustatis, apice rotundatis et approximatis, 6—11 cm longis et 0,5—2,5 cm latis ornatus. Cetera ignota.

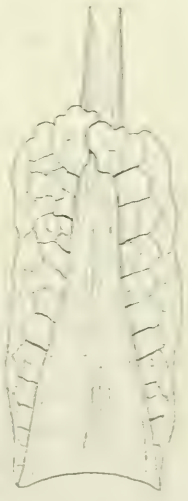


Fig. 38. *Dendroseris regia*. base of leaf showing auricles. $^{1}/_{2}$ nat. size.

Masafuera: on the high ridges and in the alpine region, scattered and often associated with ferns. — Edge of western precipice above Buque Varado, c. 1250 m; Las Torres, 1370 m, rare; near the Correspondencia Camp 850—1130 m, stray specimens (no. 570); C. Atravesado, c. 1300 m, rare; C. del Barril, 925 m, many specimens on the steep slope of the Vacas gorge; east slope of Los Inocentes, 740—950, also observed growing on *Dicksonia*.

A most noticeable plant, the second species of the hitherto monotypic subgen. *Phoenicoseris*, not so tall as *pinnata*, but more robust than this and with different leaves. In a way these resemble the leaves of var. *insignis*, as the pinnae lack the basal segment characteristic of *pinnata* proper, but otherwise they are, of course, easy to distinguish from the variety and are known by their size, laciniated margins and auricles. Unfortunately, not a single specimen flowered or was going to bloom, and not one dead tree with an old inflorescence was ever seen, so that the species cannot have flowered recently. The seedling has simple, cordate-reniform leaves, just as in *D. pinnata*.

Area of distribution: Endemic in Masafuera.

139. **D. neriifolia** (Dcne) Hook. et Arn. — JOHOW, Estud. 69.

Masatierra: BERTERO no. 1499! Herb. Kew; leg. 1830, mart. flor.; valleys between Pto Frances and El Pangal, especially south of El Rabanal (JOHOW!).

According to JOHOW this occurs »con bastante frecuencia» south of Rabanal. Much to our regret we never found it, in spite of a regular hunt in all directions over the tract indicated by JOHOW; undoubtedly it is very local and JOHOW had good luck when he discovered it. We saw nothing but *D. micrantha* in these parts; it occurs here below the forest line in a stunted, narrow-leaved form, sometimes recalling *neriifolia*, but the leaves are thinner and the venation is different. The head is of about the same appearance in both, but with very few (7—8) scales in *neriifolia*. The flowers are very much the same.

Area of distribution: Endemic in Masatierra.

140. **D. micrantha** (Bert. et Dcne) Hook. et Arn. — JOHOW, Estud. 68. — Fig. 39 a—c.

Masatierra: Common in the east and central parts, from Pto Frances to Co Chumacera, in forests and thickets, especially higher up on the slopes of the valleys and on the dividing ridges, 400—600 m; also in the denser forests on steep slopes, but never seen in the high forest along the bottom of the valleys. In the eastern section, from Pto Frances to Pangal, it forms a conspicuous feature in the shubberies below the lower limit of the woods, where also the maqui is common. Here the trees are smaller, the leaves smaller and more firm and their edge generally quite entire; the inflorescence too, is smaller, but otherwise there seems to be no material difference, so I think we may explain this lowland form as a local adaption to the dry, sunny stations. — Small buds $^{1}/_{1}$ 17, no. 1236; fl. $^{19}/_{3}$ 17, no. 567; fr. $^{28}/_{3}$ 17, no. 581. $^{11}/_{4}$ 17, no. 1237, $^{17}/_{4}$ 17, no. 618.

The head is about 9 mm high and 10 mm across, the funnel-shaped involucre 5 mm high and 4 mm across, composed of c. 11 scales. The flower

number 25, more or less. The corolla is 7 mm long with comparatively short and broad ligule, abruptly contracted into the narrow tube. The broad, sessile, auriculate bracts are not caducous as in the next species but remain during the time of flower.

D. micrantha as is the largest of the genus, a middle-sized tree with a well developed main trunk 2—3 dm thick.

Area of distribution: Endemic in Masatierra.

141. **D. pruinata** (Joh.) Skottsb. — *D. micrantha* var. *pruinata*, JOHOW, Estud. 68. — Fig. 39 d—f.

D. micranthae arcte affinis sed multis notis dispar. Arbor pumila rarius ultra bi- vel trimetralis, parce subdichotome ramosa. Folia sessilia amplexicaulia, oblanceolata, obtusiuscula, integerrima, subcoriacea, subtus ut cortex pedicellique pruinata. Panicula sat parva et cum illa praecedentis comparata paucicapitata, bracteis magnis auriculatis mox caducis. Capitula quam in *D. micrantha* conspicue majora, ad 14 mm lata et alta; involucrum campanulatum, 10 mm altum et medio 7 mm latum dein leviter constrictum, pruinatum, squamis circ. 14, carnosis apice puberulis. Flores circ. 75, lactei. Corolla 11 mm longa, ligula $6 \times 3{,}5$ mm; stamina lutea; stylus albidus ramis viridescentibus applanatis. Achaenia obovata 2,5 mm longa, glabra, vage costata nec non transverse rugosa, pappo 2—2,5 mm longo. Floret mense Januario.

Masatierra: In the dry barren coastal region, scattered; seen by us only on the south side of the island. — C. Salsipuedes (JOHOW); Pta San Carlos (JOHOW); Pto Ingles, coast rocks (JOHOW); between the foot of Co Yunque and Villagra, fine specimens in the ravines opening into the sea (fl. $^{7}/_{1}$ 17, no. 232); B. Chupones, coast rocks.

Santa Clara: Ravines of the coast cliff; Morro de los Alelíes (fr. $^{26}/_{1}$ 17). Also observed by JOHOW.

It is evident that the »micrantha» from the sea coast is different from the ordinary one, and at first JOHOW was inclined to regard it as a species. But as he found that plants of both, cultivated in Santiago, were too like each other, he gave up this idea and wanted to explain the special characters of *pruinata* as resulting from external conditions. It must not be forgotten that almost sessile leaves, more or less coated with wax, occur in young *micrantha* in open stations, and it is true that by the characters of the leaf *D. pruinata* is well adapted to the conditions prevailing on the sea coast, but there are differences not readily explained in this manner. *D. pruinata* bore flowers in December—January, even in places facing S., while not a single specimen of *micrantha*, even in the most favorable northerly exposition, flowered before the end of February. Further, the head is much larger, the flowers much more numerous, the bracts caducous etc. The achenes are a trifle smaller in *micrantha* and perhaps more regularly costate.

According to JOHOW both forms were found growing together on Salsipuedes, and this, if correct, hardly speaks in favour of his opinion.

Area of distribution: Endemic in Masatierra and Santa Clara.

142. **D. gigantea** Joh., Estud. 69; SKOTTSBERG, Stud. 6. — Fig. 39 g—k.

Masafuera: On the walls of the canyons and on the slopes of the valleys, in the forest region, not uncommon. Q. Sanchez, 800—880 m, scattered; Las Chozas, in the forest near the abandoned village, 650 m (no. 549); Q. del Mono, c. 600 m; Q. de las Casas, on the canyon walls, generally out of reach (JOHOW; SKOTTSBERG 1908); Q. del Blindado, 370—460 m, on steep slopes with *Myrceugenia* (fl. $^{19}/_{2}$ 17, no. 436); Q. Inocentes, c. 500 m; Q. del Varadero, not uncommon in the smaller branch and on the slopes higher up, 650 m.

Known before only from the Casas Valley, where JOHOW obtained a few pieces by aid of a gun; by throwing stones I got hold of some leaves in the same place in 1908. It is, however, much more common in other stations and much better developed.

Fig. 39. a—c *Dendroseris micrantha:* a head, × 1 $^{1}/_{3}$, b scales, × 1 $^{1}/_{3}$, c floret, × 3 $^{1}/_{3}$. d—f *D. pruinata:* d head, × 1 $^{1}/_{3}$, e scales, × 1 $^{1}/_{3}$, f floret, × 3 $^{1}/_{3}$. g—k *D. gigantea:* g head, × 1 $^{1}/_{3}$, h floret, × 3 $^{1}/_{3}$, i lobe of ligule, × 24, k unripe achene, × 6 $^{2}/_{3}$.

Larger than most of its congeners, reaching a height of 8—10 m; the thickest stem measured was 28,5 cm in diameter 1 m above the ground. The leaves not rarely attain $^{1}/_{2}$ m, those of young trees which have not yet flowered reaching enormous dimensions (largest measured 85 cm long, including the 4 cm long petiole, and 26 cm broad). Only old dry pieces of the inflorescence were known before. The panicles are broad ovoid and over 1 m high, and contain many thousand heads. The branches of the first and second order are supported by subsessile, ovate acuminate foliaceous bracts; those of the last order are more rigid than the others, 4—6 cm long, and exit under an angle of 45 to 60°; they bear a pseudo-corymb of 10 to 20 heads, each supported by a bract. The pedicels are short, with 1—3 small bracteoles. Head narrow campanulate, 12—13 mm long and about 8 mm across; involucre green and purple, 9—10 mm high, 4—5 mm wide above the funnel-shaped base, composed of c. 13 scales, the outer linear-triangulate with pubescent tip, the inner almost linear, 8 mm long. Flowers about 25; corolla 10 mm long, creamy white, purplish when old; ligule split almost to its base into five narrow segments with convolute, slightly penicillate tips; stamens yellow; style hardly darker

than the stamens, less exserted than in other species. Pappus very long, 6—7 mm, white, later rufescent. Ovary pauci-costate; ripe achenes not seen.

While the vegetative organs seem to indicate a close affinity between *D. gigantea* and *D. micrantha*, the flowers show that the former occupies a rather independent position in the subgenus *Rea:* in fact, it differs so much from the other species, not only of this subgenus, but of the genus as a whole, that it well deserves to from a special section. The corolla is peculiar, and the pappus longer than in other species. The seedling, too, is remarkable, for the leaves are deeply incised, recalling those of the common oak.

Area of distribution: Endemic in Masafuera.

Addendum.

Since my description of **Euphrasia formosissima** was printed, Professor R. WETTSTEIN kindly sent me the following remarks on this species:

»*Euphrasia formosissima* ist eine sehr auffallende und leicht kenntliche Art; sie unterscheidet sich von allen andern Arten schon auf den ersten Blick durch den kräftigen Wuchs, die üppige Beblätterung und die starke Verzweigung.

Sie steht der südamerikanischen Section *Trifidae* Benth. *sehr ferne* und gehört zweifellos der Section *Eueuphrasia* Wettst. an, welche die europäischen, asiatischen, nordamerikanischen, australischen und neuseeländischen Arten der Gattung, ferner *E. grandiflora* Hochst.· auf den Azoren umfasst. (Vergl. R. WETTSTEIN, Monographie der Gattung Euphrasia, 1896.)

Die Arten der Section *Eueuphrasia* wurden bisher auf die beiden Subsectionen *Semicalcaratae* Benth. und *Australes* Benth. verteilt, von denen die erstere die nördlich-extropischen Arten und *E. grandiflora* umschliesst, während der letzteren die in Australien und Neuseeland vorkommenden Arten angehören. Die beiden Subsectionen lassen sich im Allgemeinen gut trennen, wenn auch Beziehungen zwischen einzelnen Arten der beiden Gruppen bestehen. So zeigt *E. insignis* Wettst. (Monogr. S. 246) aus Japan, welche zur Subsectio *Semicalcaratae* gehört, nicht zu verkennende Beziehungen zur neuseeländischen *E. cuneata* Forst. aus der Subsectio *Australes*. In neuerer Zeit sind aus Japan mehrere Arten der Subsect. *Semicalcaratae* bekannt geworden, welche eine ähnliche Stellung wie *E. insignis* einnehmen, so z. B. *E. Matsamurae* Nakai (in Fedde Repert. Spec. nov. fasc. XI p. 33, 1912) und (nach der Beschreibung) wohl auch *E. Yabeana* Nakai (l. c.) und *E. nummularia* Nakai (l. c. p. 34). Es scheint also in Japan eine reicher gegliederte Artengruppe zu existieren, welche zur Subsectio *Australes* hinneigt.

Dieser japanischen Gruppe von Zwischenformen zwischen den Arten der Subsectio *Semicalcaratae* und denen der Subsectio *Australes* reiht sich nun in sehr bemerkenswerter Art *E. formosissima* an. Sie steht einerseits der japanischen *E. insignis* Wettst., andererseits der neuseeländischen *E. cuneata* Forst. relativ am Nächsten.

Von *E. insignis* ist sie verschieden durch den kräftigen Wuchs, die stumpfen und stumpfzähnigen, am Grunde weniger verschmälerten Blätter und Bracteen, durch die grössere Zahl der Blattzähne, durch die kürzeren und stumpfen Kelchzähne, die abgerundeten Kelchbuchten und die fast gleichlangen Spitzen der Antherenhälften. — Von *E. cuneata* ist *E. formosissima* stärker verschieden, besonders durch die sitzenden Blüten und die breiteren, am Grunde nicht so stark verschmälerten Blätter.

Es ist pflanzengeographisch und florengeschichtlich gewiss höchst beachtenswert, dass *E. formosissima* morphologisch *nicht* den geographisch relativ nahen südamerikanischen Arten sich anschliesst, sondern die Verbindung zwischen japanischen und neuseeländischen Formen herstellt.»

Some remarks on the composition and character of the indigenous flora.

My list contains 142 species considered to be indigenous in Juan Fernandez. Some are questionable in this respect; but, on the other hand, a few of those enumerated below as introduced might, perhaps, equally well be classed as members of the wild flora.

There are 40 natural orders (families) and 81 genera represented; the relation between genera and species is 1 : 1,75, a proportion to be expected in a remote insular flora, all the same if we regard it as a remnant of an old flora or brought into existence by occasional transoceanic migrations.

Of the species known before to occur in the islands seven have not been found again by us, viz. *Podophorus bromoides, Trisetum chromostachyum, Cyperus reflexus, Urtica Masafuerae, Phrygilanthus Berteroi, Cardamine chenopodiifolia* and *Dendroseris neriifolia.* In the case of *Urtica* and *Cardamine,* the season was not the proper one. On the other hand, our survey has revealed the existence in the islands of many species not found before. In 1908, 10 were added, and here 31 more are listed, so that the total increase amounts to about 40 %. It is greater still if we compare with JOHOW's flora, as a few older species have been taken up again by the writer (Wahlenbergia, Dendroseris). Some species classified as indigenous by JOHOW (some, however, with hesitation) were transferred to the introduced ones.

A great deficiency in the older floras was the scarcity of exact localities. As the physical conditions are so different in different parts of these islands, in spite of their small size, it is of course quite necessary to register the stations of all the plants; further, only in this way we get an idea of the frequency of the different species. We have done our best to supply this need.

Above, 24 species and one subspecies were described as new, or were established by other authors from my material (*Uncinia costata* Kükenth., *Agrostis masafuerana* Pilger, *Bromus masafueranus* Skottsb. et Pilger).

Only five of the new species were described from Masatierra (one, *Dendroseris litoralis,* also occurring in Santa Clara), the remainder all came from Masa-

fuera. As was foreseen, not many species in Masatierra expected their discovery: two were added in 1908 and six more in 1916—17, not counting such as were known before but have obtained their proper position in this paper *(Greigia Berteroi, Halorrhagis masatierrana, Dendroseris pruinata).* The meagre flora of Santa Clara was enriched by one species only *(Plantago *Skottsbergii).* But my high expectations as to Masafuera were quite fulfilled. Of the 72 species now recorded from this island, 8 were discovered in 1908 and 28 in 1916—17, which means an increase of 100 %. The high mountains yielded many new and interesting things. I do not flatter myself that we have come across everything, even if I am confident that future explorations will not alter the present picture of the flora very much.

In this place I wish to draw attention to certain gaps in our knowledge of some interesting plants. Of *Greigia Berteroi* flower and fruit are unknown; *Centaurodendron* has only been found with a few old achenes, and it is of considerable importance that the flowers be found. The earlier floral stages of the *Gunnera* hybrids are not known. Further, nobody has seen the male flowers of *Robinsonia macrocephala,* and our knowledge of the flowers of *Dendroseris neriifolia* and *D. pinnata* var. *insignis* is too imperfect. All these species belong to Masatierra. Of the new species from Masafuera, *Berberis masafuerana* and *Dendroseris regia* were described from sterile specimens, and *Ranunculus caprarum* and *Fagara externa* have only been found with fruit.

The distribution of the phanerogams within the Juan Fernandez group is made clear in the table below.

	Masatierra		Santa Clara		Masafuera		In all three islands	In Masatierra and Santa Clara, not in Masafuera	In Masatierra and Masafuera, not in Santa Clara
	Total	Confined to	Total	Confined to	Total	Confined to			
	96	65	9	1	72	45	4	4	23
% of the flora		45 %		0,7 %		31,7 %	2,8 %	2,8 %	16 %

We learn from these figures that there is a considerable difference between the islands. Of 142 species, only 27, or 19 %, are common to Masatierra and Masafuera. The more fertile valleys of the former offer better conditions to a forest flora, while the alpine species of the latter are wanting: Masatierra is c. 950, Masafuera c. 1500 m high. The poorness of the flora of Santa Clara no doubt results from very unfavorable climatic conditions; we must not forget that also the western part of Masatierra is very poor in species compared with the central and eastern parts.

The Juan Fernandez Islands are famous for their numerous and peculiar endemic types. Of the genera, 81 in number, only 10 are endemic, but, with the exception of *Ochagavia,* all of them are strongly marked; *Lactoris* is the type of a separate order, and all the others occupy a very independent position and have no very near relatives. Further, the species of *Bromus* (formerly known as Megalachne) and *Eryngium* (once described under the name Lessonia) form separate sections. Of 142 species not less than 98 or 69 % are endemic;

I have counted the subspecies *Luzula *insularis, Margyricarpus *digynus, Dysopsis *hirsuta* and *Plantago *Skottsbergii* among the species, while the less marked endemic forms or varieties of some species were left out of consideration.

The endemism in the different islands is illustrated below.

	Masatierra		Santa Clara		Masafuera		In all three islands	In Masatierra and Santa Clara, not in Masafuera	In Masatierra and Masafuera, not in Santa Clara
	Total	Confined to	Total	Confined to	Total	Confined to			
Number of end. spec. . .	65	49	6	1	44	32	1	4	11
% of all J. F. endemics		50 %		1 %		33 %	1 %	4 %	11 %
% of the flora of the island in question	68 %		66 %		61 %				

As seen above, 50 % of the endemic species are found only in Masatierra, 33 % only in Masafuera, and 1 % *(Chenopodium Sanctae Clarae)* only in Santa Clara; only 12 species (12 %) are common to Masatierra and Masafuera. Thus, the floristic difference between the islands appears still more pronounced when it comes to the endemic species. And it may be added that of the 10 endemic genera 8 are found exclusively in Masatierra and 2 in both islands, so that Masafuera does not possess any special endemic genus. These questions will be dealt with further in another paper.

Finally, I wish to draw attention to the fact that so many of the endemic types are very scarce; I am sure that all the existing specimens of some of the rarest plants may be counted without much labour. Of species from Masatierra, *Podophorus bromoides* and *Phrygilanthus Berteroi* have not been found by later collectors and no exact locality is known. *Greigia Berteroi, Chenopodium Crusoeanum, Eryngium inaccessum, E. fernandezianum* and *Dendroseris macrantha* were reported from one locality each: of the latter two only 2 specimens could be found, and all are very scarce. Other very rare plants are *Peperomia margaritifera, Selkirkia, Plantago fernandezia, Robinsonia thurifera* and *Centaurodendron.* One or more of these will probably share the fate of *Santalum fernandezianum,* which seems to be extinct. In one or two cases I could not secure as much material as I wanted for fear of destroying the species altogether.

At present the wild flora is more or less protected, as cutting of wood for fuel is very limited and the supply mainly filled by the worst enemy of the wild flora, *Aristotelia maqui;* still, the consumption is far from sufficient to check the progress of the latter. To judge from Chilean newspapers, a new peril now seems to be imminent. It is reported that Masatierra will become converted into a pleasure resort with large hotels etc. Fortunately enough, there is no good bathing beach, and much money is needed to build roads comfortable enough for the average tourist, so that there is some hope that little will be done during the present financial crisis.

In Masafuera, also some species seem to be rare. *Peperomia Skottsbergii, Ranunculus caprarum* and *Cardamine Krüsselii* were found in one locality each;

Chenopodium nesodendron, Robinsonia Masafuerae and *Dendroseris regia* are very scarce, and their recovery is checked by the too numerous wild goats. Many of the non-endemic species are also rare. Since this island was abandoned by the penal settlement in 1914, it has remained uninhabited. Fortunately enough, the landing difficulties are very great.

The preservation of the original nature in these islands is a question of general importance to the scientific world and ought to be a matter of honour with the Chilean nation. However, many Chileans, in spite of their ardent love for their country, do not understand the necessity of the modern nature-protecting movement. In the case of Juan Fernandez, the matter, often so complicated, is much simplified, for no conflict is likely to arise between the »unpractical idealists» and the men of industry and business. It will be generally admitted that little or nothing is gained by destroying the primeval vegetation in these islands. The source of income is not agriculture but fishing, and the fishing colony will thrive even if the terrestrial fauna and flora are protected. It is true that the presence of human dwellings is undesirable, but as it is now, colonisation is limited to one valley and cannot be expected to extend much more. Certainly we cannot very well propose to remove the inhabitants.

Regarding the present international relations and other unfavorable circumstances it is probably hopeless to ask the leading scientific circles of the world to join in an action for the protection of Juan Fernandez. This is very unfortunate, for I hardly think the Chilean Government would meet an application from such institutions with complete refusal.[1]

My program is summarized as follows.

Protection of animal and plant life; licence to collect scientific specimens may be obtained from the Chilean Government on the recommendation of Museo Nacional in Santiago. — The rights of the colonists should be regulated and the regulations enforced. — All arrangements likely to direct a tourist traffic to the islands should be prohibited. — A Government representative with sufficient scientific training should be appointed as supervisor and provided with suitable means to fight the maqui and other noxious weeds. — The actual prohibition to kill the wild goats should be rescinded (or suspended for some years only, if it be found desirable to preserve a small stock of these animals, introduced several centuries ago and offering some historic interest). Further, the following additional measures should be taken regarding Masafuera:

Prohibition to erect permanent settlements. — The stock of goats should be cut down and not allowed to increase again, or destroyed altogether (in order to supply fresh meat in case of emergency, some other less harmful animal might be introduced).

[1] Since this was written I have read in a German newspaper that the Chilean Government proposes to convert the islands into a »national park». Let us hope that the newspaper in question speaks true!

II. Introduced species.

Everybody knows that it is often hard to tell if a certain species is indigenous or not in a certain place. Many circumstances have to be considered; still there are instances where a definite result cannot be obtained. In Masatierra large pieces of ground have become spoilt by man during the last three hundred years. It seems probable that species, even if they are true members of the Chilean flora, that only inhabit such parts or have been found only in places often visited by the inhabitants, should by classed as introduced. On the other hand, wide-spread species not belonging to the anthropochorous assemblage may be regarded as truly indigenous also in Juan Fernandez and were listed among the wild species in this paper. If we can rely upon the older accounts of the vegetation of Masafuera, also this island was more densely wooded in bygone times, and the removal of the forest opened a vast field for all sorts of immigrants.

Nearly all the species enumerated below were introduced unintentionally. A few useful plants brought on purpose and which have run wild, were also included.

1. **Paspalum distichum** L. — JOHOW, Estud. 133. — Syn. *P. fernandezianum* Colla. — **Masatierra:** BERTERO. — Pto Frances, B. Cumberland, Pto Ingles (JOHOW). Not seen by us. — Also in Chile.

2. **Setaria geniculata** Roem. et Schult. — JOHOW l. c. 133. — **Masatierra:** B. Cumberland (JOHOW). Not seen by us. — Also in Chile.

3. **Setaria imberbis** Roem. et Schult. — **Masatierra:** DOUGLAS! — V. Colonial (no. 17); Q. Juanango (no. 606). — Also in Chile.

4. **Phalaris intermedia** Bosc. — JOHOW l. c. 134. — **Masatierra:** Pto Ingles (SKOTTSBERG 1908). — Also in Chile.

5. **Anthoxanthum odoratum** L. — JOHOW l. c. 134. — **Masatierra:** Rather common in the basal region, frequent in the outer parts of the valleys and extending up on the ridges (nos. 205, 246). Acc. to JOHOW probably introduced during the last 50 years, as it is not in earlier collections. — **Masafuera:** Very common, from the coast to the highest mountains, perhaps the most abundant species in the island (no. 560). — Also in Chile.

6. **Polypogon crinitus** Trin. — JOHOW l. c. 136. — Wet places, not uncommon. **Masatierra:** Pangal, wet moss mats in the waterfall (no. 225); B. Cumberland (JOHOW), east side of V. Colonial (no. 207); Pto Ingles, wet rocks near landing place (no. 326); Q. Juanango, in the stream; stream near the foot of Co Negro. — **Masafuera:** Q. de las Casas, common by the small waterfalls in the gorge (no. 472); Q. Angosta and Q. del Varadero, in the same kind of station; Playa Ancha, on the flat beach (no. 1185); Q. de la

Lobería, characteristic of the waterfalls (no. 495). Agrees very well with European specimens, as shown by Fig. 1 k. — Also in Chile.

*7. **Agrostis stolonifera** L. — **Masafuera:** Q. Angosta, at the waterfall in the gorge (no. 559). — Also in Chile?

8. **Gastridium lendigerum** (L.) Gaud. — SKOTTSBERG, Stud. 23. — **Masatierra:** Douglas! — Common in Chile.

9. **Aira caryophyllea** L. — JOHOW, l. c. 137. — **Masatierra:** Rather common in the basal region, more so in the western part (JOHOW; SKOTTSB. no. 31, 31 b). — **Masafuera:** GERMAIN; B. Toltén; Q. de las Casas (no. 1111). — Also in Chile.

10. **Aira praecox** L. — JOHOW l. c. 136. — **Masatierra:** MOSELEY. *Masafuera: Q. de las Casas (no. 110). — Not in Chile acc. to JOHOW.

11. **Avena barbata** Brot. — *A. hirsuta* Roth, JOHOW l. c. 138. — **Masatierra:** Very common in the basal region, abundant in the dry western parts (JOHOW; SKOTTSB. no. 130). — **Santa Clara:** JOHOW; Morro de los Alelíes. — **Masafuera:** East coast (JOHOW); B. Toltén. — Also in Chile.

12. **Briza minor** L. — JOHOW l. c. 138. — **Masatierra:** V. Colonial (JOHOW), hills west of B. Villagra (no. 256). — Also in Chile.

13. **Poa annua** L. — JOHOW l. c. 138. — **Masatierra:** MOSELEY. — ***Masafuera:** On the top of Los Inocentes, c. 1500 m (no. 303). — Also in Chile.

*14. **Poa pratensis** L. — **Masafuera:** In several places on the south side, large tufts on the shore (no. 494). — Also in Chile.

15. **Festuca dertonensis** (All.) Aschers. et Graebn. — *F. muralis* Kth., JOHOW l. c. 139. — **Masatierra:** B. Cumberland, not uncommon (nos. 107, 109, 147); Portezuelo de Villagra (no. 29); B. del Padre (JOHOW); scattered from Villagra to Pta Larga (no. 248). — Also in Chile.

16. **F. sciuroides** Roth. — JOHOW l. c. 139. — **Masatierra:** MOSELEY. — **Masafuera:** in the higher parts (JOHOW). — Common in Chile.

17. **Bromus unioloides** Kth. — JOHOW l. c. 139. (*B. cebadilla* Steud.) — **Masatierra:** B. Cumberland (JOHOW), on the cemetery (no. 182); Pto Ingles; Q. Juanango (no. 607); B. del Padre (JOHOW); Plan del Yunque; Villagra (no. 237). — ***Masafuera:** B. Toltén (no. 467); Q. de las Casas (no. 445); on the shore from Casas to Vacas; common in the Vacas canyon; Lobería Vieja; near Las Chozas, c. 650 m (no. 1108). — Also in Chile. Prof. PILGER remarks in a letter to the writer: »*B. cebadilla* Steud. ist eine Form von B. unioloides, bei der die Behaarung der unteren Scheiden dicht und weich ist (STEUDEL: vaginis inferioribus dense retrorsum villoso-tomentosis). Diese Form ist in Chile verbreitet».

18. **Lolium multiflorum** Poir. — JOHOW l. c. 140. — **Masatierra:** B. Cumberland (JOHOW); in the colony (no. 177); Pto Ingles; Plan del Yunque; B. Villagra, not uncommon (no. 249). — *Masafuera: Lobería Vieja. — Common in Chile.

19. **Hordeum murinum** L. — JOHOW l. c. 141. — **Masatierra:** DOUGLAS! V. Colonial (JOHOW, SKOTTSB.); Q. Juanango; B. del Padre (JOHOW, SKOTTSB.); Plan del Yunque; Villagra (no. 236). — **Santa Clara** (JOHOW, SKOTTSB.). — **Masafuera:** coast and mountains (JOHOW, SKOTTSB. no. 492). — Also in Chile.

20. **Hordeum nodosum** L. — JOHOW l. c. 141. — **Masatierra:** CUMING, JOHOW. — Common in Chile.

*21. **Phrygilanthus tetrandrus** (Ruiz et Pav.) Eichl. — **Masatierra:** Unintentionally introduced into a garden together with plants of *Olea europaea.* (fl. $^{28}/_{4}$ 17, no. 626). — Common in Chile.

22. **Rumex crispus** L. — JOHOW l. c. 121. — **Masatierra:** V. Colonial (JOHOW, SKOTTSB. no. 204); Pto Ingles; Q. Juanango; B. del Padre (JOHOW, SKOTTSB.); Villagra. — **Santa Clara** (JOHOW, SKOTTSB.). — **Masafuera:** B. Toltén; Q. de las Casas (JOHOW, SKOTTSB.). — Also in Chile.

23. **Rumex conglomeratus** Murr. — SKOTTSB. Stud. 19. — *Masatierra: El Pangal (no. 223); V. Colonial (no. 1205); Q. Juanango. — **Masafuera:** Q. de las Casas (no. 455); Lobería Vieja, abundant. — Also in Chile?

24. **Rumex pulcher** L. — JOHOW l. c. 121. — **Masatierra:** V. Colonial (no. 20); Pto Ingles, common; south-west part (JOHOW, SKOTTSB.). — **Santa Clara:** JOHOW, SKOTTSB. — **Masafuera:** Hills north of Casas (JOHOW); Q. de las Casas, abundant near entrance; Q. de la Lobería, forest, 175 m. — Also in Chile.

25. **Rumex acetosella** L. — JOHOW l. c. 121. — **Masatierra:** Very abundant in the barren parts, also seen on some of the high ridges. JOHOW, SKOTTSB. no. 184. — **Masafuera:** Very abundant on the upper plains and hills (JOHOW, SKOTTSB.), frequent in the alpine region f. i. on Las Torres, 1370 m. — Also in Chile.

26. **Polygonum hydropiperoides** Michx var. *virgatum* (Cham. et Schlecht.) Meisn. — JOHOW l. c. 120. — **Masatierra:** JOHOW; small stream below the chapel hill (no. 124). — Common in South Chile.

27. **Polygonum aviculare** L. — JOHOW l. c. 120. — **Masatierra:** V. Colonial (JOHOW, SKOTTSB. no. 209). — Common in Chile.

28. **Chenopodium murale** L. — JOHOW l. c. 118. — **Masatierra:** Pto Frances (JOHOW); B. Cumberland (JOHOW, SKOTTSB. no. 286); Pto Ingles; B. del Padre (nos. 287, 288). — **Santa Clara:** JOHOW, SKOTTSB. no. 348. — **Masafuera:** (JOHOW); B. Toltén. — Also in Chile.

29. **Chenopodium multifidum** L. — *Roubieva*, JOHOW l. c. 119. - **Masatierra:** BERTERO; V. Colonial (JOHOW; SKOTTSB. no. 208); B. del Padre, especially on El Puente (no. 294). — **Masafuera:** scattered along the coast rocks, B. Toltén, Q. del Pasto, Q. de las Casas (JOHOW), Playa Ancha, Lobería Vieja. — Also in Chile.

30. **Chenopodium ambrosioides** L. — Listed for Juan Fernandez by REICHE, Flora de Chile VI : 1. 150. — **Masafuera:** The colony in Q. de las Casas (no. 361). — My specimens belong to *Ch. chilense* Schrad. as described by REICHE l. c., a more hairy form than *ambrosioides*. I have compared with the material in Herb. Kew, which shows considerable variation in this respect; there are specimens from Australia, that should be brought to *chilense*.

*31. **Amaranthus chlorostachys** Willd. — **Masatierra:** V. Colonial (no. 355). — Not quoted from Chile.

*32. **Amaranthus deflexus** L. — **Masatierra,** on roads in the colony (no. 145). — Also in Chile.

33. **Monocosmia monandra** (Ruiz et Pav.) Pax. — JOHOW l. c. 116. — **Masafuera:** GERMAIN 1854. Never found again. — Not rare in waste places in Chile.

34. **Stellaria media** (L.) Cyr. — JOHOW l. c. 117. — **Masatierra:** Pto Frances (JOHOW); B. Cumberland (MOSELEY, SKOTTSB.). — **Masafuera:** forest near Casas (JOHOW), in the canyon; Las Torres, 1370 m. — Common in Chile.

35. **Stellaria cuspidata** Willd. — JOHOW l. c. 117. — **Masatierra:** El Rabanal (JOHOW). Also collected by BERTERO a. o.; B. indicated this as found in the moist woods of the higher mountains, but we have never seen a trace of it, and JOHOW found it under circumstances that make it most probable that it was introduced. — Chile.

36. **Cerastium caespitosum** Gilib. — *C. vulgatum* L., JOHOW l. c. 117? — **Masafuera:** Q. de las Casas (JOHOW? SKOTTSB. no. 385); Las Torres, 1370 m. — Also in Chile.

*37. **Cerastium glomeratum** Thuill. — **Masatierra:** Portezuelo, below the pass (no. 332). — **Masafuera:** Q. de las Casas (no. 1207). — Also in Chile. — REICHE calls this C. vulgatum L.; thus it is possible that JOHOW meant this species and not the preceding.

38. **Sagina chilensis** Naud. — JOHOW l. c. 117. — **Masafuera:** GERMAIN. Never found again. — Centr. Chile.

39. **Silene gallica** L. — JOHOW l. c. 116. — **Masatierra:** V. Colonial (JOHOW, SKOTTSB.); Pto Ingles; west part (JOHOW). — **Santa Clara:** JOHOW, SKOTTSB. — **Masafuera:** Q. de las Casas (JOHOW); B. Toltén. — Also in Chile.

40. **Anemone decapetala** L. — JOHOW l. c. 113. — **Masatierra:** REED acc. to JOHOW. Never found again. — Widespread in Chile.

41. **Ranunculus muricatus** L. — JOHOW l. c. 113. — **Masatierra:** DOUGLAS etc.; V. Colonial (no. 117); B. Villagra. — Also in Chile.

42. **Lardizabala biternata** Ruiz et Pav. — JOHOW l. c. 115. — **Masatierra:** Plazoleta del Yunque (JOHOW, SKOTTSB. no. 482 ♀). — Occurs in great quantity on a very small area, forming an entangled mass resting on the trees and shrubs like a heavy net and almost killing them. It was first recorded by JOHOW who says it grows in the forest at the foot of the Yunque, especially in the Plazoleta. As far as I have been able to ascertain, the latter place is the only locality known to the inhabitants, and I think it is limited to this spot. At first it appeared strange that a plant so admirably adopted to the mild climate of Masatierra should not have spread through the forests, but the explanation was soon found. The islanders are very familiar with the edible fruit of this on the continent, and they told me that the plant never produces any fruit in Juan Fernandez. In the end of March I found the flowers: all were female and not a single male one could be discovered; *Lardizabala* is dioecious, and there are only female plants in the island. This makes JOHOW's theory that it has been introduced quite probable, if on purpose or not; the former possibility has to be considered, as A. VON RODT planted trees (Eucalypts etc.) on the Plazoleta. In any case, the *Lardizabala* in Masatierra comes from few seeds, all female (or perhaps from a single one?). I hope that the male plant will never be introduced. — Chile.

43. **Sisymbrium officinale** (L.) Scop. — JOHOW l. c. 110. — **Masatierra:** B. Cumberland (JOHOW, SKOTTSB. no. 203). — Common in Chile.

44. **Brassica nigra** (L.) Koch. — JOHOW l. c. 109. — **Masatierra:** B. Cumberland, »la maleza mas comun» (JOHOW). Seems to have disappeared. — Chile.

45. **Brassica napus** L. — JOHOW l. c. 110. — **Masatierra:** El Rabanal (JOHOW); B. del Padre (JOHOW), common on the Puente (BÄCKSTRÖM no. 1210); Villagra, Q. de la Chozas, wet rocks in the forest (no. 249) and a similar place on the slope of Co Chumacera (no. 249 b). — **Santa Clara** (JOHOW). — ***Masafuera:** Lobería Vieja, abundant and of enormous size.

*46. **Brassica rapa** L. — **Masatierra:** B. del Padre (no. 1211).

47. **Raphanus sativus** L. — JOHOW l. c. 110. — **Masatierra:** Has almost disappeared since the visit of JOHOW; seen by us only in B. del Padre. — ***Masafuera:** Q. de las Casas, in the colony; Lobería Vieja.

*48. **Nasturtium aquaticum** (L.) Wg. — **Masatierra:** V. Colonial, abundant in the streams (no. 156). Introduced on purpose; common in Chile.

*49. **Matthiola incana** (L.) R. Br. — **Masatierra:** Intentionally introduced; has run wild round B. del Padre, going very strong in the sand on the

Puente (no. 289); also **Santa Clara** (no. 1212) and Morro de los Alelíes, which derives its name from it. Possibly sown by the fishermen in all these places. — **Masafuera:** Q. de las Casas, the colony.

50. **Fragaria chilensis** Ehrh. — JOHOW l. c. 92. — **Masatierra:** Mrs. GRAHAM etc.; V. Colonial (JOHOW) and Villagra (JOHOW); found by us in Portezuelo by the path (no. 10). — ***Masafuera:** in the interior of Q. de las Casas. Introduced with the convicts in 1909; cultivated in the gardens of the abandoned Chozas Village. — Chile.

51. **Acaena argentea** Ruiz et Pav. — JOHOW l. c. 92. — **Masatierra:** One of the most widespread and noxious weeds, in the basal region and on the ridges, covering the ground for large stretches (no. 113, 113 b, f. *grandiceps* Bitter; no. 113 c, 171, 1239). In Masatierra, it has hybridized with *Margyricarpus*, see above p. 133. — ***Masafuera:** Las Chozas; Q, de las Casas, behind the colony (no. 459, near f. *pluribracteata* Bitter).

Professor BITTER remarks to this species: »Sowohl bei Pflanzen von Masatierra (Nr. 113, 113 c) als auch von Masafuera (Nr. 459) habe ich bis 6-jochige Blätter angetroffen; die untersten Blättchen waren aber meist winzig, schmal lineal, viel kleiner als die wohl ausgebildeten Nebenblätter. Die beiden auf Juan Fernandez gefundenen Formen der *A. argentea* (f. *grandiceps* Bitt. in Bibl. Bot. 74, S. 217 als var.) und f. *pluribracteata* (ibid. S. 216) weichen nur wenig von den festländischen Formen der in Chile weit verbreiteten Art ab, wahrscheinlich gehen sie auch in einander über; ich habe jedoch vom Festland weder so grossköpfige noch mit so auffällig zu mehreren am Schaft verteilten reducierten Blättern versehene Exemplare gesehen.»

52. **Medicago sativa** L. — JOHOW l. c. 89. — **Masatierra:** Common near the colony acc. to JOHOW; not seen by us. — ***Masafuera:** Q. de las Casas, the abandoned settlement. — Common in Chile.

53. **Medicago denticulata** Willd. — JOHOW l. c. 89. — **Masatierra:** DOUGLAS etc.; V. Colonial (no. 200); El Puente (no. 1213); Q. Juanango; B. Chupones. — ***Santa Clara.** — ***Masafuera:** Las Casas, in the settlement. — Also in Chile.

54. **Medicago maculata** Willd. — JOHOW l. c. 89. — **Masatierra:** B. Cumberland (JOHOW). — Also in Chile.

*55. **Medicago lupulina** L. — **Masatierra:** V. Colonial (no. 116). — Also in Chile.

56. **Melilotus indicus** (L.) All. — *M. parviflorus* Desf., JOHOW l. c. 89. — **Masatierra:** DOUGLAS etc.; V. Colonial (JOHOW, SKOTTSB. no. 101); B. del Padre and Puente (JOHOW, SKOTTSB. no. 1214); Plan del Yunque, Co Negro etc. — **Santa Clara,** common (JOHOW, SKOTTSB.). — ***Masafuera:** Q. de las Casas, at the settlement; Lobería Vieja. — Also common in Chile.

57. **Trifolium pratense** L. — JOHOW l. c. 88. — **Masatierra:** B. Cumberland (JOHOW). — Escaped from cultivation. Also in Chile.

*58. **Trifolium repens** L. — **Masafuera:** Q. de las Casas. — Also in Chile.

59. **Geranium core-core** Steud. Flora XXXIX (1856) — ? *G. pusillum*, JOHOW l. c. 107. — **Masatierra:** BERTERO, MOSELEY; V. Colonial (no. 112); Pto Ingles; Q. Juanango; Q. Villagra; B. Chupones. — In Herb. Kew, (collected by MOSELEY) as *G.* ? *patagonicum;* HEMSLEY called it *G. dissectum* in Chall. Rep. It is neither of these. Unfortunately, I have not seen BERTERO's specimens, from which STEUDEL's description was prepared; they came from Central Chile and Juan Fernandez. My plants agree with the short description. KNUTH's monograph in Pflanzenreich IV: 120 is, in this case, of little or no use. It is not impossible that this *Geranium* is indigenous in Masatierra. A G. sp. (the same?) was found by us in Masafuera, but I have no material of it.

60. **Geranium robertianum** L. — JOHOW l. c. 107. — **Masatierra:** MOSELEY. — Also in Chile.

61. **Erodium cicutarium** (L.) L'Hérit. — JOHOW l. c. 107. — **Masatierra:** West part (JOHOW). — **Santa Clara** (JOHOW). — **Masafuera** (JOHOW). — Common in Chile.

62. **Oxalis laxa** Hook. et Arn. var. *micrantha* (Bert.). — JOHOW l. c. 106. — **Masatierra:** Moist mountain wall in the forest of Q. de la Choza, with some other weeds (no. 258). — Chile. — This is *O. laxa*, leg. MOSELEY, Herb. Kew. JOHOW lists both *laxa* (GERMAIN) and *micrantha* (BERTERO). — Chile.

63. **Oxalis corniculata** L. — JOHOW l. c. 105. — ***Masatierra:** V. Colonial (no. 119). — **Masafuera:** B. Toltén (no. 463); Q. de las Casas, common (JOHOW, SKOTTSB.). — Widespread in Chile.

64. **Ruta chalepensis** L. var. *bracteosa* (DC.) Engler. — JOHOW l. c. 104. — **Masatierra:** B. Cumberland, along the path to Pangal (no. 104; Pta San Carlos (JOHOW); Tres Puntas (JOHOW); Q. Juanango; B. del Padre (JOHOW). — **Masafuera:** the shore near Las Casas (JOHOW, SKOTTSB.). — In Chile; probably intentionally introduced, as also in Juan Fernandez.

65. **Euphorbia lathyris** L. — SKOTTSB. Stud. 18. — **Masatierra:** DOUGLAS! — Also in Chile.

*66. **Euphorbia peplus** L. — **Masatierra:** Common round the colony (no. 142); Pto Ingles. — Also in Chile.

67. **Callitriche stagnalis** Scop. — ? *C. verna* L., JOHOW l. c. 103. — **Masatierra:** B. Cumberland, small stream in the colony (no. 1215, det G. SAMUELSSON). — *C. verna* L., quoted from Chile, where it is not considered to be indigenous, probably includes more than one species.

68. **Aristotelia maqui** L'Hér. — JOHOW l. c. 108. — **Masatierra:** Forming extensive shrubberies in the outer parts of the valleys, penetrating

far into the primeval forests and reaching the high mountains in several places. (no. 186). — *__Masafuera:__ Near the road to Las Chozas, c. 460 m, one shrub seen; Q. del Blindado, c. 440 m, many specimens in the woods. As some specimens were quite stout, it is possible that the maqui was introduced before 1909, when the convict settlements were established, having escaped the attention of JOHOW and the writer. But the growth is extremely rapid. — Chile.

69. **Modiola caroliniana** (L.) Moench. — JOHOW l. c. 107. — **Masatierra:** V. Colonial (DOUGLAS; JOHOW; SKOTTSB. no. 115). — **Masafuera:** Near the shore on the east side (JOHOW, SKOTTSB.). — Also in Chile.

70. **Anoda hastata** Cav. — Syn. *A. fernandeziana* Steud. in Flora 1856, p. 437, acc. to REICHE l. c. I, 239. — **Masatierra:** BERTERO. Never found again. — Also in Chile (indigenous?).

71. **Malva parviflora** L. — JOHOW l. c. 118. — **Masatierra:** Pto Ingles; Q. Juanango; Tres Puntas. — **Santa Clara** (JOHOW; SKOTTSB. no. 346). — Also in Chile.

72. **Malva nicaeensis** All. — JOHOW l. c. 108. — **Masatierra:** V. Colonial (JOHOW; SKOTTSB. no. 181). — Also in Chile.

73. **Lythrum hyssopifolia** L. — JOHOW l. c. 97. — **Masatierra:** MOSELEY; V. Colonial (JOHOW; SKOTTSB. no. 121); south side of island from Plan del Yunque to Pta Larga, scattered. — Also in Chile.

74. **Ugni Molinae** Turcz. — JOHOW l. c. 94. — **Masatierra:** V. Colonial (JOHOW); especially on the lower slopes of C. Central (no. 190), and along the path to Portezuelo, to about 200 m; two small shrubs near the SELKIRK memorial, 590 m; Q. Villagra, rare. Probably introduced on purpose, as the fruits are much appreciated in Chile, where the species is indigenous.

75. **Oenothera mollissima** L. — *O. propinqua* Spach, JOHOW l. c. 99. — **Masatierra:** B. Cumberland, common in the east part of the colony (JOHOW, SKOTTSB. no. 141). — *__Masafuera:__ Q. de las Casas. — Indigenous in Chile. I know no better name for this; after REICHE's Flora it ought to be called *O. stricta* var. *propinqua*, but the *stricta* I have seen in herbaria seems different and is not at all so pubescent. I am afraid that REICHE's classification, based on the length of the perianth tube, does not hold good.

76. **Sanicula liberta** Cham. et Schlecht. — JOHOW l. c. 101. — **Masatierra:** REED, MOSELEY! On the slope of C. Salsipuedes, some specimens in forest at the road-side, c. 350 m (no. 91). — Most likely introduced, as the barbed fruits cling to the clothes. — Perú and Chile.

77. **Torilis nodosa** Gaertn. — SKOTTSB. Stud. 17. — **Masatierra:** DOUGLAS! — Also in Chile.

*78. **Apium** cfr. **chilense** Hook. et Arn. — **Masatierra:** Pta San Carlos (no. 273). — One very imperfect specimen. REICHE brought *A. chilense* to

australe, probably because there are specimens of this in Herb. Santiago named *A. chilense* by PHILIPPI. But the type of the latter in Herb. Kew clearly represents a distinct species. Possibly *Ligusticum*(?) *fernandezianum* Phil. (see REICHE, Flora III. 116) is the same as my no. 273.

*79. **Apium graveolens** L. — **Masatierra:** V. Colonial, on the beach (no. 144), an escape from the gardens.

80. **Apium laciniatum** DC. — SKOTTSB. Stud. 17. — **Masatierra:** V. Colonial (no. 114); B. del Padre (SKOTTSB. 1908). — Chile. May have reached Juan Fernandez without the aid of man.

81. **Petroselium sativum** (L.) Hoffm. — JOHOW l. c. 102. — **Masatierra:** GRAHAM etc.; formerly found as an escape, not seen lately. — ***Masafuera:** Q. Angosta, by the waterfall in the gorge.

*82. **Anethum graveolens** L. — **Masafuera:** Q. de las Casas, near the settlement; Lobería Vieja; escaped from cultivations.

*83. **Ammi visnaga** (L.) Lam. — **Masatierra:** V. Colonial (no. 178). — Also in Chile.

84. **Daucus australis** Poepp. — JOHOW l. c. 103. — **Masatierra:** GERMAIN, PHILIPPI. Seems to have disappeared. — Chile.

85. **Anagallis arvensis** L. — JOHOW l. c. 87. — **Masafuera:** On the shore near Casas and Vacas (JOHOW, SKOTTSB. no. 498); Playa Ancha; Lobería Vieja. — Also in Chile.

86. **Centunculus pentandrus** R. Br. — JOHOW l. c. 86. — **Masafuera:** GERMAIN. Never found again. — Also in Chile.

87. **Erythraea chilensis** Pers. — JOHOW l. c. 86. — **Masatierra:** Common in El Rabanal and in the west part of the island acc. to JOHOW. Must have disappeared, as no trace of it was seen at any time of the year, in spite of being especially searched for. — Common in Chile.

88. **Convolvulus arvensis** L. — JOHOW l. c. 86. — **Masatierra:** V. Colonial (JOHOW, SKOTTSB. no. 228). — ***Masafuera:** the abandoned village of Las Chozas. — Also in Chile.

89. **Collomia gracilis** Dougl. — JOHOW l. c. 85. — Found in PHILIPPI's list of 1856, without other indications — collected by GERMAIN? — California — Chile.

90. **Gilia valdiviensis** Griseb. — **Masafuera:** Herb. Santiago! ded. LEYBOLD (coll. by GUAJARDO). Never found again. — Chile.

*91. **Cynoglossum pictum** Ait. — **Masatierra:** V. Anson, V. Colonial (no. 270), Pto Ingles, Q. Villagra. — Also in Chile.

92. **Verbena litoralis** Kth. — JOHOW l. c. 79. — **Masatierra:** DOUGLAS etc. In the colony (JOHOW; SKOTTSB. no. 180); Pto Ingles (JOHOW, SKOTTSB.); Q. Juanango; Villagra; B. Chupones. — ***Masafuera:** Q. de las Casas near the settlement; Q. de la Lobería, 190 m. — Common in Chile.

93. **Marrubium vulgare** L. — JOHOW l. c. 80. — **Masatierra:** along the path from the colony to Pangal (JOHOW, SKOTTSB. no. 103); Pto Ingles. — **Masafuera:** B. Toltén; Q. de las Casas (JOHOW, SKOTTSB.). — Also in Chile.

94. **Melissa officinalis** L. — JOHOW l. c. 80. — An escape from gardens. — **Masatierra:** in the colony (JOHOW, SKOTTSB. no. 338). — **Masafuera:** Q. de las Casas (JOHOW, SKOTTSB.).

95. **Mentha aquatica** L. — JOHOW l. c. 79. — **Masatierra:** in the colony (JOHOW), Plazoleta del Yunque, abundant (JOHOW). Seems to have disappeared; at least there was no trace of it in the places indicated. — Also in Chile.

*96. **Mentha pulegium** L. — **Masafuera:** round the settlement in Las Casas (no. 462). — Also in Chile.

97. **Physalis peruviana** L. — *Ph. pubescens* R. & P., JOHOW l. c. 84. — **Masatierra:** V. Colonial (JOHOW, SKOTTSB. no. 166); Pto Ingles (JOHOW); Q. Juanango. — **Masafuera,** widely spread: B. Toltén, Las Casas, near Las Chozas, Papal (JOHOW, SKOTTSB.), Lobería Vieja. — Also in Chile.

98. **Cestrum parqui** L'Hér. — JOHOW l. c. 84. — Escaped from gardens. — **Masatierra:** Streets of the village (JOHOW, SKOTTSB. no. 69); Pto Ingles. — **Masafuera:** Q. de las Casas (JOHOW, SKOTTSB.). — Chile.

*99. **Solanum argenteum** Dun. — Escaped from gardens. — **Masatierra:** V. Colonial (SKOTTSB. 1908). — **Masafuera:** near the settlement in Q. de las Casas. — Not reported from Chile.

*100. **Verbascum virgatum** Stokes ex With. — **Masafuera:** near the settlement in Q. de las Casas (no. 1221) and by the road to Las Chozas. — Also in Chile.

*101. **Veronica persica** Poir. — **Masatierra:** V. Colonial, Q. Seca, one plant seen (no. 1217). — Also in Chile.

102. **Plantago major** L. — JOHOW l. c. 78. — **Masatierra:** in the colony (no. 210); El Pangal (JOHOW); south slope of Co Chumacera, in forest. — Also in Chile.

*103. **Plantago lanceolata** L. — **Masatierra:** V. Colonial (no. 179). — **Masafuera:** the abandoned village of Las Chozas. — Also in Chile.

*104. **Galium aparine** L. — **Masafuera:** the abandoned village of Las Chozas. — Also in Chile.

105. **Dipsacus silvestris** Huds. — JOHOW l. c. 72, as *D. fullonum* L. — **Masatierra:** B. Cumberland (JOHOW, SKOTTSB. no. 269); Pto Ingles (JOHOW); Q. Juanango; Q. Villagra. — Also in Chile. My specimens agree better with *D. silvestris*, but the paleae are recurved almost as in what generally goes as *D. fullonum*.

106. **Lobelia tupa** L. — JOHOW l. c. 76. — **Masatierra:** V. Colonial, near the cemetery (JOHOW, SKOTTSB. no. 183); between Pico Central and Pangal, many groups (JOHOW, SKOTTSB.). — Chile.

107. **Micropsis nana** DC. — JOHOW l. c. 52. — **Masatierra:** GERMAIN acc. to JOHOW; V. Colonial, rare (no. 16). — On GERMAIN's label is indicated: »Masafuera y Juan Fernandez oct. 1854». JOHOW lists *Micropsis* among the introduced species. — Chile.

108. **Gnaphalium cheiranthifolium** Lam. — JOHOW l. c. 61. — **Masatierra:** In the dry basal region, from Pto Frances to B. Cumberland, not uncommon (SCOULER! BERTERO! etc.; nos. 272, 354); C. Salsipuedes, to 750 m (no. 1227); Pto Ingles (JOHOW, SKOTTSB. no. 327); La Vaquería; B. del Padre (JOHOW); Villagra (no. 263). — **Santa Clara** (JOHOW), Morro de los Alelíes (SKOTTSB.). — ***Masafuera:** On the higher ridges, from the Chozas Village, c. 650 m (no. 430), to C. Atravesado, 1360 m. Recently introduced, probably since 1909. — Chile.

109. **Gnaphalium aldunateoides** Remy. — JOHOW l. c. 62. — **Masafuera:** GERMAIN, JOHOW, near the landing place. — Chile.

110. **Gnaphalium stachydifolium** Lam. — JOHOW l. c. 62. — **Masatierra:** Co Pirámide, c. 600 m (no. 191); Pta San Carlos (JOHOW); C. Salsipuedes, c. 730 m (no. 93); Pto Ingles (JOHOW); Villagra (no. 254). — **Santa Clara** (JOHOW). — **Masafuera:** Q. de las Casas (no. 444). — Chile. My specimens are quite like *G. Berterianum* DC. (BERTERO no. 1029, Herb. Kew!), a species generally reduced to *stachydifolium*. JOHOW's material under this name belongs in part to the next.

*111. **Gnaphalium spicatum** Lam. — **Masatierra:** V. Colonial (no. 118, 1229). **Masafuera:** Q. de las Casas (no. 454), in the alpine region, 700—1200 m, only few seen (no. 1228). — There are at least three forms in my collection. — Also in Chile.

112. **Erigeron canadensis** L. — SKOTTSB. Stud. 5. — **Masatierra:** Q. Juanango; B. del Padre (SKOTTSB. 1908). — **Santa Clara** and Morro de los Alelíes (no. 1230, leg. BÄCKSTRÖM). — **Masafuera:** Q. de las Casas. — Also in Chile.

*113. **Erigeron linifolius** Willd. — **Masatierra:** B. del Padre (no. 291: »typisches Ex. von E. linifolius», F. VIERHAPPER in sched.). — Also in Chile? *E. strictus* Hook. et Arn., a dubious species acc. to REICHE, was quoted for Juan Fernandez, leg. SCOULER, by HOOKER and ARNOTT, Comp. Bot. Mag. II. 50. Most likely this refers to a specimen in Herb. Kew. named *Conyza*

ambigua DC., and collected by SCOULER; *C. ambigua* is a synonym of *E. linifolius*.

*114. **Xanthium spinosum** L. — **Masatierra:** On a road in the colony (no. 627). — Also in Chile.

115. **Bidens leucantha** (L.) Willd. — JOHOW l. c. 52. — **Masatierra:** REED; Pto Frances (QUENSEL 1908); V. Colonial (SKOTTSB. 1908). — Centr. Chile.

116. **Galinsoga parviflora** Cav. — JOHOW l. c. 53. — **Masatierra:** GERMAIN. — ***Masafuera:** B. Toltén, a small hispid specimen (no. 469). — Also in Chile.

117. **Amblyopappus pusillus** Hook. et Arn. — JOHOW l. c. 53. — **Masatierra:** B. del Padre, especially on the Puente (no. 290); west parts of the island (JOHOW). — **Santa Clara:** JOHOW; Morro de los Alelíes (JOHOW, SKOTTSB.). — Perú — Chile. In Stud. 29 I listed this among the indigenous species. JOHOW supposed that it had been accidentally introduced, and I now agree with him. It is hardly probable that a plant, so numerous in places and quite conspicuous on account of the barren soil, should not have been collected before JOHOW. Known in Chile for its medicinal properties, and perhaps intentionally introduced to the islands.

118. **Bahia ambrosioides** Lag. — JOHOW l. c. 52. — **Masafuera:** Entrance to Q. de las Casas, extending a few hundred meters to the north and a little to the south of this place (GUAJARDO, JOHOW, SKOTTSB. no. 443). The limited distribution of this species, confined to a place where almost every visitor lands (if he is able to), makes me believe that it was introduced with the traffic. It is also noteworthy that *Bahia* is not in GERMAIN's collection. Still, there is perhaps as much reason to call it indigenous. — N. and Centr. Chile.

*119. **Anthemis cotula** L. — **Masatierra:** B. Cumberland, between stones on the shore (no. 143). — Masafuera? no material preserved. — Also in Chile.

*120. **Cotula australis** Hook. fil. — **Masatierra:** B. Cumberland (FUENTES, April 1911, Herb. Santiago!). — **Masafuera:** Q. de las Casas (no. 1231). — Widespread, also in Chile.

*121. **Senecio vulgaris** L. — **Masatierra:** Q. Salsipuedes (no. 631). — **Masafuera:** Q. de las Casas, in the settlement (no. 419). — Also in Chile.

*122. **Cirsium lanceolatum** (L.) Scop. — **Masafuera:** El Papal, near the old huts. — Also in Chile.

*123. **Cynara cardunculus** L. — **Masafuera:** the abandoned village of Las Chozas. — Also in Chile.

124. **Silybum Marianum** Gaertn. — JOHOW l. c. 64. — **Masatierra:** DOUGLAS etc. Very abundant in the bottom of valleys from Pto Frances to

El Puente and also on the south side of the island; one of the dangerous weeds (no. 197). — **Masafuera:** Q. de las Casas (JOHOW, SKOTTSB.), Papal, Lobería Vieja. — Also common in Chile.

125. **Centaurea melitensis** L. — JOHOW l. c. 64. — **Masatierra:** DOUGLAS etc. Pta San Carlos (no. 271); Pto Ingles; B. del Padre (JOHOW, SKOTTSB. no. 292). — **Santa Clara** and Morro de los Alelíes. — **Masafuera:** Q. de las Casas; Q. de las Vacas (JOHOW). — Also in Chile.

*126. **Cichorium intybus** L. — **Masatierra:** In the colony (no. 176). — **Masafuera:** Settlement of Las Casas. — Also in Chile.

*127. **Lapsana communis** L. — **Masafuera:** Village of Las Chozas (no. 520). — Also in Chile.

128. **Hypochoeris glabra** L. — JOHOW l. c. 65. — **Masatierra:** V. Colonial (no. 111); B. del Padre (JOHOW); Pta Larga. — Also in Chile.

*129. **Taraxacum** (officinale) **fernandezianum** Dahlstedt nov. spec. — »Folia (basalia) oblonga — obovato-oblonga lobis latis curvatis unguiformibus approximatis praedita, lobis lateralibus in superiore margine valde convexis integris vel subintegris vel parce et minute — crebre et longius dentatis, acutis, lobo terminali in foliis exterioribus parvo triangulari vel sagittato, acutiusculo, in interioribus majore ovato-sagittato marginibus convexis integris vel subintegris, supra glabra — subglabra, subtus araneoso-pilosa. Petioli alati pallide rubro-violacei. Nervus medianus inferne rubroviolaceus superne pallidus. Pedunculi inferne rubroviolacei superne pallidiores, erecti vel decumbentes, toti vel superne araneoso-pilosi. Involucrum parvum—mediocre, saepe sat latum, obscure olivaceo-viride. Squamae involucri exteriores sat numerosae angustae e basi paulo latiore lineari-lanceolatae, saepius supra squamas interiores attingentes, quam eae pallidiores, vulgo cupreo-coloratae in margine saepe araneosae, laxe adpressae vel erecto-patentes apicibus recurvis, ecorniculatae, interiores lineares magis obscurae saepe (praesertim in margine) araneoso-pilosae. Calathium parvum, ut videtur laete luteum. Ligulae marginales extus stria badio-violacea notatae. Antherae polliniferae vel polline fere carentes. Stylus luteus, stigmata obscura. Achaenium sordide stramineum inferne late spinulosum, spinulis apice dentatis squamiformibus, vel fere laeve, superne acutius spinulosum, 3—3,5 mm longum, 1—1,7 mm latum, pyramide 1 mm longo, rostro 7—7,5 mm longo.» — **Masatierra:** in the colony (no. 122). — **Masafuera:** Settlement of Las Casas (no. 528). — Remarkably enough no *Taraxacum* has been reported before from the islands. In a letter to the writer Dr. DAHLSTEDT remarks that the new species is not nearly related to any of the numerous Scandinavian forms. As the group Vulgaria, to which it belongs, is a Eurasiatic group without indigenous representatives in other parts of the world, it is clear that the species has been introduced to the islands. It should be mentioned that the shape of the leaves is somewhat different in the two islands. Probably the form comes from South Europe, very likely via Chile. The Taraxaca of these parts of the world have not been studied very well.

130. **Sonchus oleraceus** L. — JOHOW l. c. 65. — **Masatierra:** V. Colonial (no. 167); Pto Ingles; Q. Juanango; B. del Padre (no. 293); Plan del Yunque; Q. de la Choza, wet rock wall in the forest, with other weeds (no. 250). — **Santa Clara** and Morro de los Alelíes. — **Masafuera:** B. Toltén; Las Casas; Playa Ancha; Lobería Vieja. — JOHOW quotes MOSELEY as the only collector. J. referred the common *Sonchus* of the islands to *S. fallax* Wallr., most likely by a mistake, for it is hardly probable that this has disappeared and become replaced by the other. — Also in Chile.

* * *

We learn from this list that the number of weeds is great in the islands, even if some seem to have disappeared and others are scarce. Many play a very important part in the vegetation, such as *Anthoxanthum odoratum, Avena barbata, Rumex acetosella, Acaena argentea, Aristotelia maqui, Gnaphalium cheiranthifolium, Amblyopappus pusillus* and *Silybum Marianum*. The western half of Masatierra and Santa Clara are completely stocked with weeds. Also in Masafuera, some species are of great importance, as *Avena barbata* along the shore and *Anthoxanthum* and *Rumex acetosella* in the subalpine and alpine tracts. It is with little enthusiasm that I have had to report numerous species new to the islands. I cannot help putting this in relation to the erection of the penal colony in 1909. The traffic increased, some new weeds were brought to Masatierra and many more to Masafuera. Certainly, this island was abandoned after some years, but the weeds did not leave with the convicts.

List of literature.

This list does not at all contain all the books and papers where plants from Juan Fernandez are mentioned. It is limited to works of greater importance for our knowledge of the flora, and also includes such papers where species from the islands are mentioned for the first time. Well-known handbooks etc. are not enumerated here.

Barnéoud, M.: Monographie générale de la famille des Plantaginées. Paris 1857. — P. fernandezia.

Bentham, G.: in DC., Prodr. XII (1848). — Cuminia.

(Bertero, C.): Notice sur l'Histoire naturelle de l'île Juan Fernandez, extraite d'une lettre de M. Bertero. — Ann. sci. nat. 1. sér., T. XXI. Paris 1830. — Letter to Mr. Guillemin.

Bitter, G.: Die Gattung Acaena. — Bibl. Botan. 74 (1910—11).

—— Weitere Untersuchungen über die Gattung Acaena. Fedde's Repert. X (1912).

—— Solana nova vel minus cognita V. Ibid. XI (1912).

Boott, F.: Caricis species novae vel minus cognitae. — Trans. Linn. Soc. XX (1846).

—— Uncinia Douglasii Boott, in J. D. Hooker, Flora Antarctica II (1847).

De Candolle, A.: Monographie des Campanulacées. Paris 1830.

—— Genres nouveaux appartenant à la famille des Composées ou Synanthérées. — Arch. de Botanique II. Paris 1833.

De Candolle, A. P.: In DC. Prodr. VII (1838). — Pernettya rigida.

Clarke, C. B.: Cyperaceae (praeter Caricinas) Chilenses. — Engler's Jahrb. XXX (1901).

Colla, A.: Plantae rariores in regionibus chilensibus a cl. M. D. Bertero nuper detectae. — Mem. della R. Accad. d. scienze di Torino XXXVII (1834), XXXVIII (1835), XXXIX (1836).

Decaisne, J.: Note sur un nouveau genre de Cichoriacées, recueilli par M. Bertero dans l'île Juan Fernandez. — Arch. de Botanique I. Paris 1833.

—— Monographie des genres Balbisia et Robinsonia, de la famille des Composées. — Ann. Sci. nat. 2. Sér., T. I. Paris 1834.

Don, D.: Descriptive Catalogue of the Compositae contained in the herbarium of Dr. Gillies; with some additions from other sources. — The Philos. Magazine, or Ann. of Chemistry etc., Vol. XI. London 1832. — Dendroseris.

Don, G.: A general history of the Dichlamydeous plants III. London 1834. — Coprosma.

Douglas, D.: A sketch of the journey to the north-western parts of North America, during the years 1824, 5, 6, and 7. — Comp. to the Botan. Magazine, by W. J. Hooker. Vol. II. London 1836.

(——) Journal kept by David Douglas during his travels.... Publ. under the direction of the R. Hortic. Soc. London 1914.

Drude, O.: Juania australis in J. D. Hooker, Progr. and Cond. of the R. Bot. Gardens Kew. 1884.

Fuentes, F.: Revisiones en la Flora Chilena. Familia Juncáceas. Bolet. del Museo Nacional, Santiago 1917.
Gay, C.: Historia física i política de Chile. Botánica, 8 vols. Paris 1845—52.
Graham, Maria: Libertia formosa Grah. in The Edinb. New Philos. Journ., Oct. 1833.
Hemsley, W. B.: Report on the Botany of Juan Fernandez, the Southeastern Moluccas, and the Admiralty Islands. Rep. Scient. Results . . . H. M. S. »Challenger». London 1885.
Hooker, J. D.: Wahlenbergia tuberosa Hook. fil. — Curtis's Bot. Mag. CI (1875), tab. 6155.
—— Dendroseris macrophylla Don. — Ibid. CIV (1878), tab. 6353.
Hooker, W. J.: Peperomia margaritifera Bert. — Icon Plant. I, tab. 91. London 1837.
Hooker, W. J. and Arnott, G. A. W.: Contributions towards a flora of South America and the islands of the Pacific. Hooker's Bot. Misc. II (1833), Journ. of Bot. I (1834), Comp. Bot. Mag. I (1835), II (1836), Journ. of Bot. III (1841).
Johow, F.: Las plantas de cultivo en Juan Fernandez. — Anal. de la Univ. de Chile LXXXIV (1893).
—— Estudios sobre la Flora de las Islas de Juan Fernandez. — Santiago de Chile 1896.
Jussieu, A. de: Rapport sur la partie botanique du voyage de M. Gay au Chili. — Arch. de Botanique II. Paris 1833.
Kükenthal, G : Cyperaceae novae V. — Fedde's Repert. XVI (1920).
Martius, K. von: Historia Naturalis Palmarum. München 1823—50.
Meisner, K. F.: Plantarum vascularium genera secundum ordines naturales digesta etc. Leipzig 1836—43. — Rhetinodendron.
Miers, J.: On three new genera of Verbenaceae from Chile and its adjacent regions. — Trans. Linn. Soc. XXVII (1871).
Miquel, F. A. W.: Systema Piperacearum. Rotterdam 1843—44.
—— Illustrationes Piperacearum. — Nov. Act. Acad. Caes. Leop.-Carol. XIX Suppl. 1846.
Montagne, C.: Prodromus Florae Fernandezianae. Pars prima. — Ann. sci. nat. 2. sér. T. II—IV. Paris 1835.
Müller Argov., K.: In DC. Prodr. XV: 2 (1866). — Dysopsis.
Oliver, D.: Santalum fernandezianum F. Phil. — Icon. Plant. 4, ser. V (1896), tab. 2430.
Pfeiffer, H.: Conspectus Cyperacearum in America meridionali nascentium. I. Heleocharis. — Herbarium 56 (1921).
Pilger, R.: Über einige Gramineae der Skottsbergschen Sammlung von Juan Fernandez. — Fedde's Repert. XVI (1920).
Philippi, F.: El árbol de sándalo de la isla de Juan Fernandez. — Anal. Mus. Nac. de Chile. 2. sección. Bot. I. Santiago 1897.
Philippi, R. A.: Observaciones sobre la Flora de Juan Fernandez. — Anal. de la Univ. de Chile 1856. German edition in Bot. Zeitung XIV (1856).
—— Plantarum novarum chilensium centuriae. — Linnaea XXIX (1857—58), XXX (1859—60), XXXIII (1865—66).
—— Descripción de algunas plantas chilenas. — Anal. de la Univ. de Chile XXVI (1865).
—— Lactoris fernandeziana Ph. — Verhandl. K. K. Zool.-bot. Ges. in Wien. XV. 1865.
—— Descripción de las plantas nuevas incorporadas ultimamente en el herbario chileno. — Anal. de la Univ. XLI (1872), XLIII (1873).
—— Bemerkungen über die chilenischen Arten von Edwardsia. — Bot. Zeitung XXXI (1873).
—— El sándalo de la isla de Juan Fernandez. — Anal. de la Univ. de Chile XLVIII (1876).

Philippi, R. A.: Plantas nuevas chilenas. — Anal. de la Univ. de Chile. LXXXI (1893), XC (1895), XCIII (1896).
Reiche, C.: Flora de Chile I—VI: 1. Santiago 1896—1911.
—— Kleistogamie und Amphicarpie in der chilenischen Flora. — Verh. d. Deutsch. wiss. Ver. Santiago IV (1901). — Cardamine chenopodiifolia.
—— Bau und Leben der hemiparasitischen Phrygilanthus-Arten. — Flora, XCVII (1907).
Rohrbach, P.: Beiträge zur Systematik der Caryophyllineen III. — Linnaea XXXVII (1871—73). — Spergularia.
Schindler, A.: Halorrhagaceae in »Pflanzenreich», IV: 125 (1905).
Skottsberg, C.: Juan Fernandez-öarnas sandelträd. — Svensk Bot. Tidskr. IV (1910).
—— Vegetationsbilder von den Juan Fernandez-Inseln. — Karsten und Schenck, Vegetationsbilder, VIII. Reihe, H. 2 (1910).
—— Studien über die Vegetation der Juan Fernandez-Inseln. — K. Sv. Vetensk.-Akad. Handl. LI: 9 (1914).
—— La Expedición científica sueca á las islas esporádicas de Chile 1916—17. Informe preliminar sobre los resultados botánicos. — Rev. de la Univ. de Córdoba (Argentina) IV: 8 (1917).
Steudel, E. G.: Synopsis plantarum glumacearum I—II.
—— Urticeae nondum descriptae. — Flora XXXIII (1850).
—— Einige Beiträge zu der Chilesischen und Peruanischen Flora, hauptsächlich nach den Sammlungen von Bertero und Lechler. — Flora XXXIV (1856).
Weddell, H. A.: Revue de la famille des Urticées. — Ann. sci. nat. 4. sér. T. I. Paris 1854.

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Explanation of the Plates.

Nos. 12, 13, 15, 17—19 reproduced from photographs taken by C. SKOTTSBERG in the islands; nos. 10, 11, 14, 16 from photographs after dried specimens by A. KARNELL; no. 20 after pictures from nature by C. SKOTTSBERG.

Plate 10.

Peperomia Skottsbergii C. DC. — 3/5.

Plate 11.

Chenopodium Crusoeanum Skottsb. — 3/5.

Plate 12.

1 *Lactoris fernandeziana* Phil. below Portezuelo, Masatierra. 2 *Eryngium inaccessum* Skottsb. at Portezuelo, Masatierra.

Plate 13.

1 *Margyracaena Skottsbergii* Bitter (centre and right), *Acaena argentea* Ruiz et Pav. (left), Valle Colonial, Masatierra. 2 *Gunnera bracteata* Steud. × *peltata* Phil., near the road to Portezuelo, Masatierra.

Plate 14.

Solanum masafueranum Bitter et Skottsb. — 3/5.

Plate 15.

1 *Euphrasia formosissima* Skottsb., Masafuera. 2 *Wahlenbergia Grahamae* Hemsl., near Portezuelo, Masatierra.

Plate 16.

1 *Erigeron Ingae* Skottsb. 2 *Erigeron turricola* Skottsb. — 3/5.

Plate 17.

1 *Robinsonia Masafuerae* Skottsb. and 2 *Dendroseris regia* Skottsb , near the Correspondencia Camp, Masafuera.

Plate 18.

Dendroseris marginata (Bert.) Hook. et Arn. at Portezuelo, Masatierra.

Plate 19.

Dendroseris litoralis Skottsb. from Morro Viñillo, in a garden in the colony, Masatierra.

Plate 20.

1—5 Seeds of *Sophora:* 1 *S. fernandeziana* (Phil.) Skottsb. var. *Reedeana* (Phil.) Skottsb.; 2 *S. masafuerana* (Phil.) Skottsb.; 3 »*S. Macnabiana* Grah.» from Chile; 4 *S. microphylla* Ait. from New Zealand; 5 *S. toromiro* (Phil.) Skottsb. from Easter Island. All nat. size. 6—7 *Euphrasia formosissima* Skottsb., × 3. 8 *Wahlenbergia Berteroi* Hook. et Arn., × 2. 9 *Wahlenbergia fernandeziana* (A. DC.) Skottsb., × 2. 10 *Wahlenbergia Grahamae* Hemsl., × 2. 11 *Dendroseris marginata* (Bert.) Hook. et Arn., × 5. 12 *Dendroseris litoralis* Skottsb., × 5.

1

2

1

2

1

2

1
2

C. Skottsberg pinx.

Proofs of this plate, printed by John & Kröstel in Leipzig, were very satisfactory, but in the final print the yellow colour in figs. 11 and 12 is too dull.

THE NATURAL HISTORY OF JUAN FERNANDEZ AND EASTER ISLAND

EDITED BY DR. CARL SKOTTSBERG

VOL. II

BOTANY

PART III

8. V. F. BROTHERUS: Musci Insulae-Paschalis.
9. F. BÖRGESEN: Marine Algae from Easter Island.
10. L. GUNNAR SJÖSTEDT: Ein neues Sargassum von der Osterinsel.
11. A. ZAHLBRUCKNER: Die Flechten der Juan Fernandez-Inseln.
12. V. F. BROTHERUS: The Musci of the Juan Fernandez Islands.

UPPSALA 1924
ALMQVIST & WIKSELLS BOKTRYCKERI-A.-B.

8. Musci Insulae-Paschalis.

Auctore

V. F. BROTHERUS.

Cum 3 tabulis (21—23).

Ex Insula Paschalis (Isla de Pascua, Easter Island) solum ut videtur duae species muscorum adhuc cognitae sunt, *Campylopus* sp. e cratere Rano Aroi et *Papillaria pascuana* Thér. n. sp. in sched., quarum cl. F. FUENTES in opusculo »Reseña Botánica sobre la Isla de Pascua» (Instituto Central meteorológico y geofísico de Chile. Publicaciones. N° 4, Santiago de Chile 1913), pag. 144 mentionem fecit. In itinere 1917 a cl. C. SKOTTSBERG una cum domina INGA SKOTTSBERG 14 species lectae mihi communicatae fuerunt, quarum 7 novas (*Papillaria* illa addita) infra descripsi.

Dicranaceae.

Campylopus Brid.

1. **C. introflexus** (Hedw.) Mitt.
Hanga Ho Orno[1], in cryptis rupium planitiei (542).
Area: In zona temperata late distributa.

2. **C.** (Trichophylli) **turficola** Broth. n. sp. — Tab. 21, Fig. 1 a—i.
Dioicus; gracillimus, caespitosus, caespitibus densis, late extensis, dilabentibus, fuscescenti-viridibus, opacis. Caulis erectus, 4—8 cm altus, haud tomentosus, dense foliosus, apice curvatulus et breviter attenuatus, simplex vel parce ramosus. Folia sicca arcte imbricata, humida erecto-patentia, canaliculato concava, e basi breviter oblonga lanceolata, mutica, singula hyalino-apiculata, c. 3 mm longa et c. 0,6 mm lata, marginibus superne subconniventibus, integris vel subintegris, comalia breviora et latiora; nervo basi tertiam partem folii

[1] = La Pérouse Bay.

occupante, dorso laevi, in sectione transversa cellulis ventralibus laxis, inanibus; cellulis laminalibus rhomboideis, basilaribus internis laxe rectangularibus, hyalinis, externis multo angustioribus, alaribus numerosis, subrotundato-hexagonis, teneris, fuscis, in ventrem dispositis, fuscis. Caetera ignota.

Rano Kao, in turfosis lacus crateris copiosissime, 110 m. s. m. (520, 521).

Species statura gracillima foliisque muticis dignoscenda.

3. **C.** (Trichophylli) **hygrophilus** Broth. n. sp. — Tab. 21, Fig. 2 a—f.

Dioicus; gracillimus, caespitosus, caespitibus densiusculis, dilabentibus, late extensis, laete viridibus, intus fuscescentibus, nitidiusculis. Caulis erectus, 10—13 cm altus, parce fusco-tomentosus, dense foliosus, innovationibus proliferis, similibus, supremis 1—4, caudatis, usque ad 2 cm longis. Folia sicca imbricata, humida erecto-patentia vel patentia, rarius falcatula, canaliculato-concava, e basi oblonga sensim lanceolato-subulata, mutica vel brevissime pilifera, ad 5 mm longa et ad 0,7 mm lata, marginibus superne subconniventibus, integris; nervo basi tertiam partem folii occupante, dorso laevi, in sectione transversa cellulis ventralibus ducibus magnitudine aequalibus; cellulis laminalibus anguste rhomboideis, basilaribus internis laxe rectangularibus, hyalinis, externis multo angustioribus, alaribus numerosis, subrotundato-hexagonis, teneris, in ventrem dispositis, fuscis. Caetera ignota.

Rano Kao, in turfosis lacus crateris, in aqua copiose, 110 m. s. m. (516—519).

Species praecedenti affinis, sed foliorum forma et nervi structura dignoscenda.

4. **C.** (Trichophylli) **dicranodontioides** Broth. n. sp. — Tab. 22, Fig. 1 a—h.

Dioicus; gracilis, caespitosus, caespitibus densis, late extensis, lutescenti-viridibus, intus fuscescentibus, nitidis. Caulis erectus, 3—5 cm altus, haud tomentosus, dense foliosus, simplex vel innovando ramosus. Folia plerumque ± distincte falcata, canaliculato-concava, lanceolato-subulata, singula ± longe pilifera, pilo erecto, subintegro vel serrulato, 4—5 mm longa, marginibus superne subconniventibus, integris vel superne minutissime serrulatis; nervo basi tertiam partem folii occupante, dorso laevi, in sectione transversa cellulis ventralibus ducibus magnitudine aequalibus; cellulis laminalibus rhomboideis, incrassatis, lumine angusto, basilaribus internis laxe rectangularibus, hyalinis, externis multo angustioribus, alaribus numerosis, subrotundato-hexagonis, teneris, fuscis, in ventrem dispositis. Setae solitariae vel binae ex eodem perichaetio, cygneae, c. 7 mm altae, stramineae. Theca regularis, breviter oblonga, sicca plicata, pallida, ore rubro. Operculum oblique rostratum. Calyptra fimbriata.

Rano Kao, locis lapidosis in cratere, circ. 125 m. s. m. (545, 548—550), cum f:a perfalcata (544). — Rano Aroi, ad moles, circ. 400 m. s. m. (547). — Etiam ab Exp. »Albatros» 21 Dec. 1904 a cl. A. Agassiz lectus (66, f:a perfalcata).

Species a praecedentibus foliis ± distincte falcatis oculo nudo jam dignoscenda, habitu *Dicranodontii.*

5. **C.** (Trichophylli) **saxicola** Broth. n. sp. — Tab. 22, Fig. 2 a—h.

Dioicus; gracilis, caespitosus, caespitibus densis, viridibus, intus fuscescentibus, opacis. Caulis erectus, vix ultra 3 cm altus, haud tomentosus, dense foliosus, simplex vel parce ramosus. Folia ± distincte falcata, canaliculato-concava, e basi lanceolata sensim longe subulata, breviter vel longius stricte pilifera, 3—4 mm longa, marginibus superne subconniventibus, apice minutissime serrulatis; nervo basi tertiam partem folii occupante, dorso laevi, in sectione transversa cellulis ventralibus laxis, inanibus, dorsalibus substereideis; cellulis laminalibus rhomboideis, basilaribus internis laxe rectangularibus, hyalinis externis multo angustioribus, alaribus numerosis, ovali-hexagonis, teneris, in ventrem dispositis, fuscis. Seta solitaria, c. 7 mm alta, sicca flexuoso-erecta, humida cygnea, lutea, laevis. Theca irregularis, oblonga, sicca plicatula. Caetera ignota.

Rano Kao, locis lapidosis, circ. 125 m. s. m. (522, 526—529). — Rano Aroi, ad moles, circ. 400 m. s. m. (525). — Hanga Ho Orno, in fissuris rupium planitiei (523, 524). — Vaintu Rova, in fissuris humidiusculis, circ. 300 m. s. m. (530).

Species a praecedente statura minore, nervi structura nec non theca irregulari dignoscenda. Habitu *Dicrano longifolio* Ehrh. similis.

Fissidentaceae.

Fissidens Hedw.

6. **F.** (Amblyothallia) **pascuanus** Broth. n. sp. — Tab. 22, Fig. 3 a—e.

Dioicus; tenellus, gregarie crescens, viridis, aetate fuscoruber opacus. Caulis 2—5 mm altus, infima basi fusco-radiculosus, dense foliosus, simplex. Folia pauci-multijuga, erecto-patentia, stricta, infima minuta, superiora raptim multo majora, lanceolato-linearia, breviter acuminata, acuta, ad 1 mm vel paulum ultra longa et ad 0,15 mm lata, elimbata, integerrima, lamina vera paulum ultra medium folii producta, lamina dorsali ad basin nervi enata ibidemque angustata; nervo lutescente, aetate rufescente, subcontinuo; cellulis subrotundis, minutissimis, minutissime papillosis. Caetera ignota.

Hanga Ho Orno, ad moles (532). — Vaintu Rova, in caverna humida, circ. 300 m. s. m. (531).

Pottiaceae.

Weisia Hedw.

7. **W. flavipes** Hook. fil. et Wils.

Rano Kao, ad rupes circ. 300 m. s. m. (534).

Area: Australia orientalis, Tasmania, Nova Zelandia.

8. **W.** sp.

Hanga Ho Orno, in pascuis (534 b).

Orthotrichaceae.

Macromitrium Brid.

9. **M.** sp.
Rano Kao, in lapidosis in cratere, circ. 125 m. s. m. (536).

Bryaceae.

Bryum Dill.

10. **B. argenteum** L. var. **lanatum** (Palis.) Bryol. eur.
Hanga Ho Orno, in pascuis frequens (507, f:a gracilis).
Area: In terris calidioribus late distributa.

Bartramiaceae.

Philonotis Brid.

11. **Ph. laxissima** (C. Müll.) Bryol. jav.
Rano Kao, circ. 300 m. s. m. (552).
Area: India orientalis, Madagascar.

Meteoriaceae.

Papillaria C. Müll.

12. **P. pascuana** Thér. ap. FUENTES l. c. sine descriptione. — Tab. 23, Fig. 1 a—f.

Dioica; gracilescens, caespitosa, caespitibus plerumque densis, rigidis, superne laete viridibus, intus lutescenti-fuscescentibus. Caulis primarius elongatus, repens, dense ramosus. Caules secundarii procumbentes vel penduli, flexuosi, ad 16 cm longi, dense foliosi, laxiuscule pinnatim ramosi, ramis patulis, vix ultra 2 cm longis, simplicibus, attenuatis vel obtusis. Folia decurrentia, sicca arcte imbricata, humida erecto-patentia, e basi cordata subsensim in laminam elongatam, lanceolato-ligulatam, acumine longiusculo, subulato instructam attenuata, c. 1,9 mm longa et c. 0,75 mm lata, marginibus integerrimis, basi ± undulatis et minutissime denticulatis; nervo lutescente, infra apicem folii evanido; cellulis rhomboideis, incrassatis, lumine angusto, papillosis, subobscuris, marginalibus laevibus, pellucidis, basilaribus internis elongatis, angustis, laevibus, pellucidis, infimis aureis. Caetera ignota.

Rano Kao, locis lapidosis in cratere, circ. 125 m. s. m. (554—557). — Rano Aroi, in cratere, c. 400 m. s. m. (558). — Vaintu Rova, in crypta humidiuscula, circ. 300 m. s. m. (553).

Species *P. cuspidiferae* (Tayl.) Jaeg. valde affinis, sed foliorum forma dignoscenda.

Fabroniaceae.

Fabronia Raddi.

13. **F. macroblepharioides** Broth. n. sp. — Tab. 23, Fig. 2 a—g.

Autoica; tenella, caespitosa, caespitibus plerumque densiusculis, late extensis, laete viridibus, sericeo-nitidis. Caulis elongatus, repens, ± radiculosus, dense ramosus, ramis brevibus, densiuscule foliosis, simplicibus, obtusis. Folia sicca plerumque homomalla, humida erecto-patentia, ovato-lanceolata, pilo ± elongato, integro terminata, marginibus erectis, fere e basi jam dense serratis, dentibus ± distincte ciliiformibus, patulis; nervo tenuissimo, ad medium folii evanido; cellulis elongate rhomboideis vel elongate hexagonis, alaribus subquadratis. Seta 5 mm vel paulum ultra alta, tenuissima, straminea. Theca e collo distincto cylindrica, fusca. Peristomium normale. Operculum oblique rostratum.

In cratere Rano Kao, locis lapidosis; 120 m. s. m. (559/563).

Species *F. macroblepharidi* Schwaegr. affinis, sed foliis brevius ciliatis, laxius areolatis nec non theca majore dignoscenda.

Rhacopilaceae.

Rhacopilum Palis.

14. **Rh. cuspidigerum** Schwaegr.

Rano Kao, locis lapidosis, c. 125 m. s. m. (566, 567).

Area: Ins. Sandwicenses, Samoa, Norfolk, Nova Caledonia.

Explicatio tabularum.

Tab. 21.

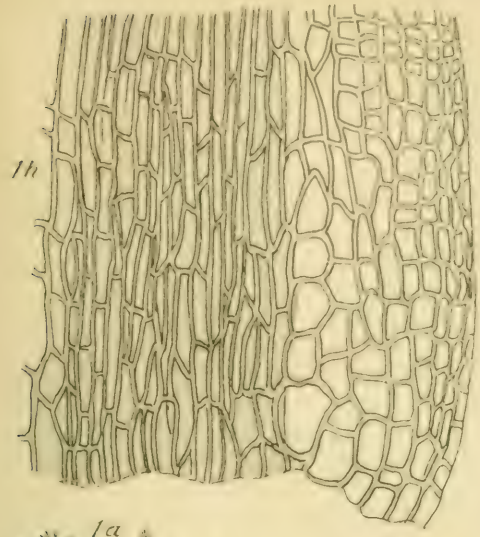
Fig. 1 a—i *Campylopus turficola* n. sp.: *a* planta sterilis (1/1); *b—d* folia (12/1); *e—g* apices (150/1); *h* pars basilaris (170/1); *i* sectio transversa partis inf. (170/1). **Fig. 2 a—f** *Campylopus hygrophilus* n. sp.: *a* planta sterilis (1/1); *b*, *c* folia (12/1); *d* apex (103/1); *e* pars basilaris (170/1); *f* sectio transversa partis inf. (170/1).

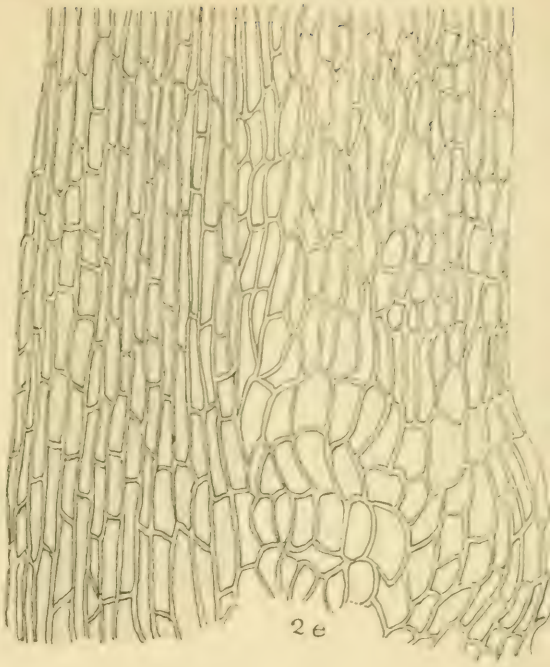
Tab. 22.

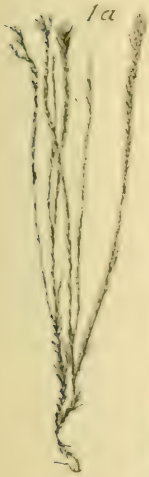
Fig. 1 a—h *Campylopus dicranodontioides* n. sp.: *a* planta fertilis (1/1); *b—d* folia (12/1); *e* apex (210/1); *f* pars basilaris (170/1); *g* sectio transversa partis inf. (170/1); *h* theca (12/1). — **Fig. 2 a—h** *Campylopus saxicola* n. sp.: *a* planta fertilis (1/1); *b—d* folia (12/1); *e* apex (480/1); *f* pars basilaris (170/1); *g* sectio transversa partis inf. (170/1); *h* theca (12/1). — **Fig. 3 a—e** *Fissidens pascuanus* n. sp.: *a* planta sterilis (1/1); *b* eadem (12/1); *c, d* folia (30/1); *e* pars apicalis (170/1).

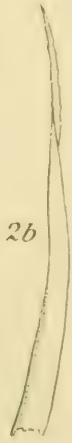
Tab. 23.

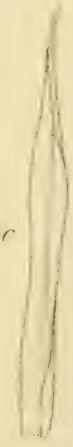
Fig. 1 a—f *Papillaria pascuana* Thér. nomen: *a* planta sterilis (1/1); *b—d* folia (12/1); *e* apex (170/1); *f* pars basilaris (170/1). — **Fig. 2 a—g** *Fabronia macroblepharoides* n. sp.: *a* planta fertilis (1/1); *b* eadem (12/1); *c, d* folia (65/1); *e* pars apicalis (170/1); *f, g* thecae (30/1).

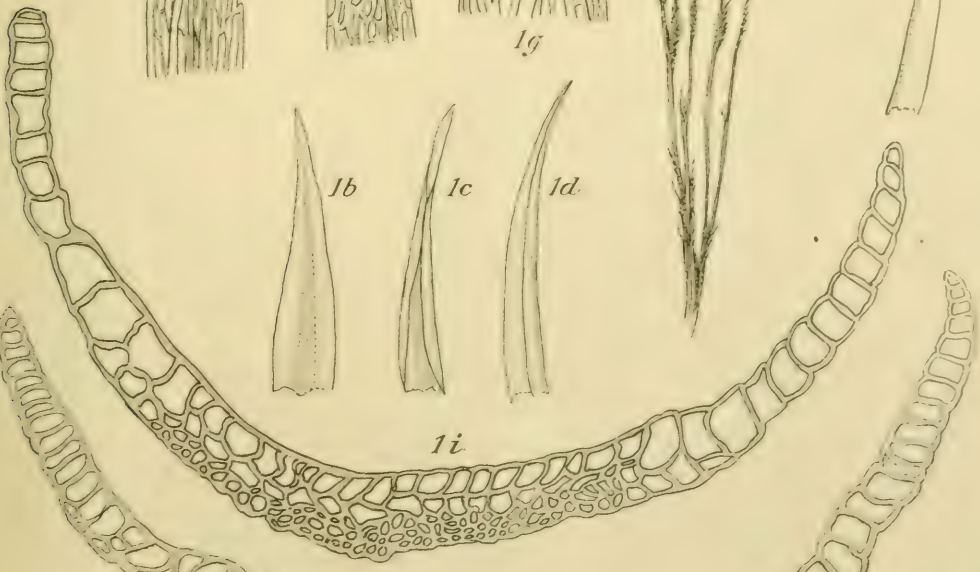












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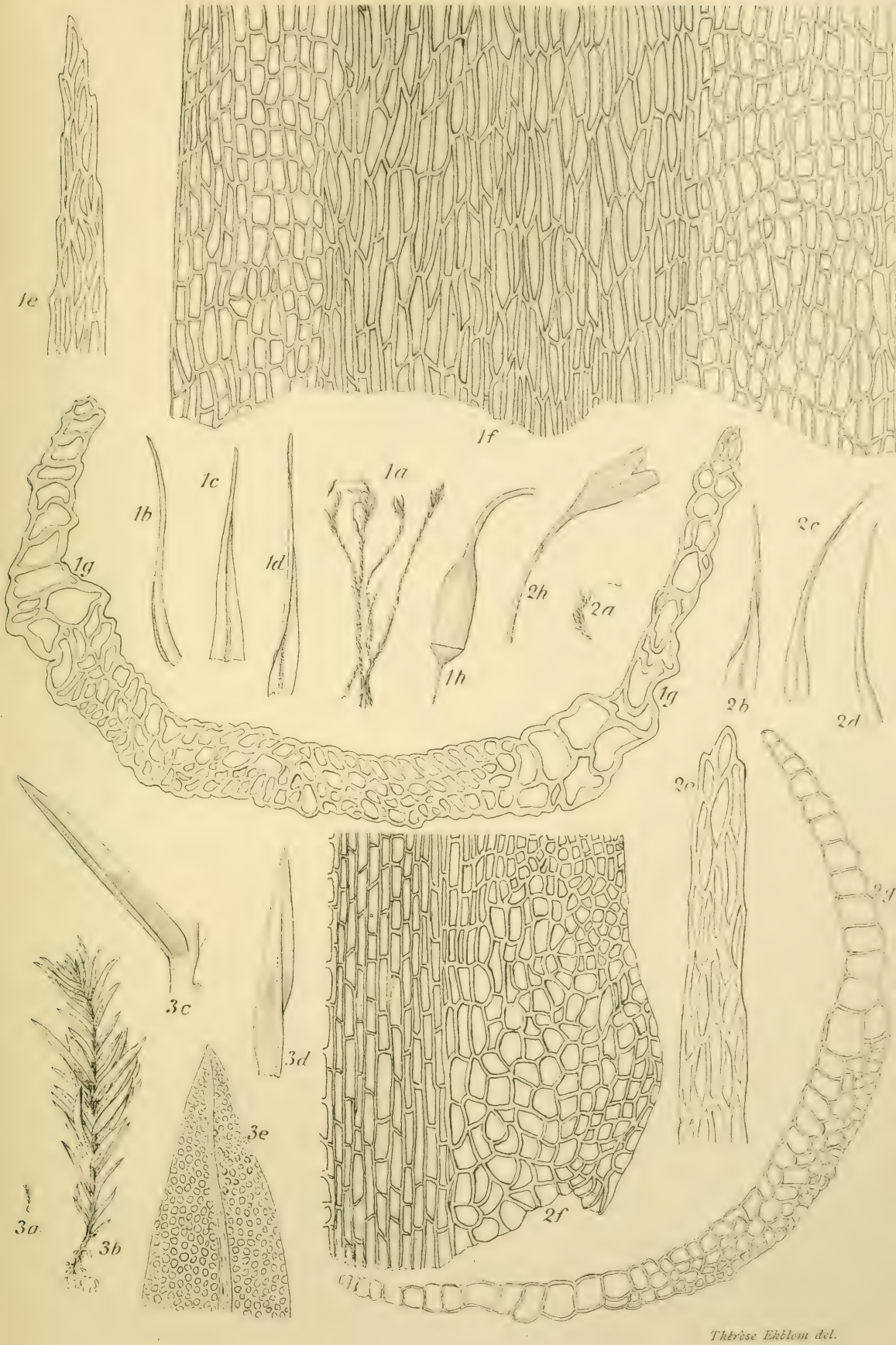

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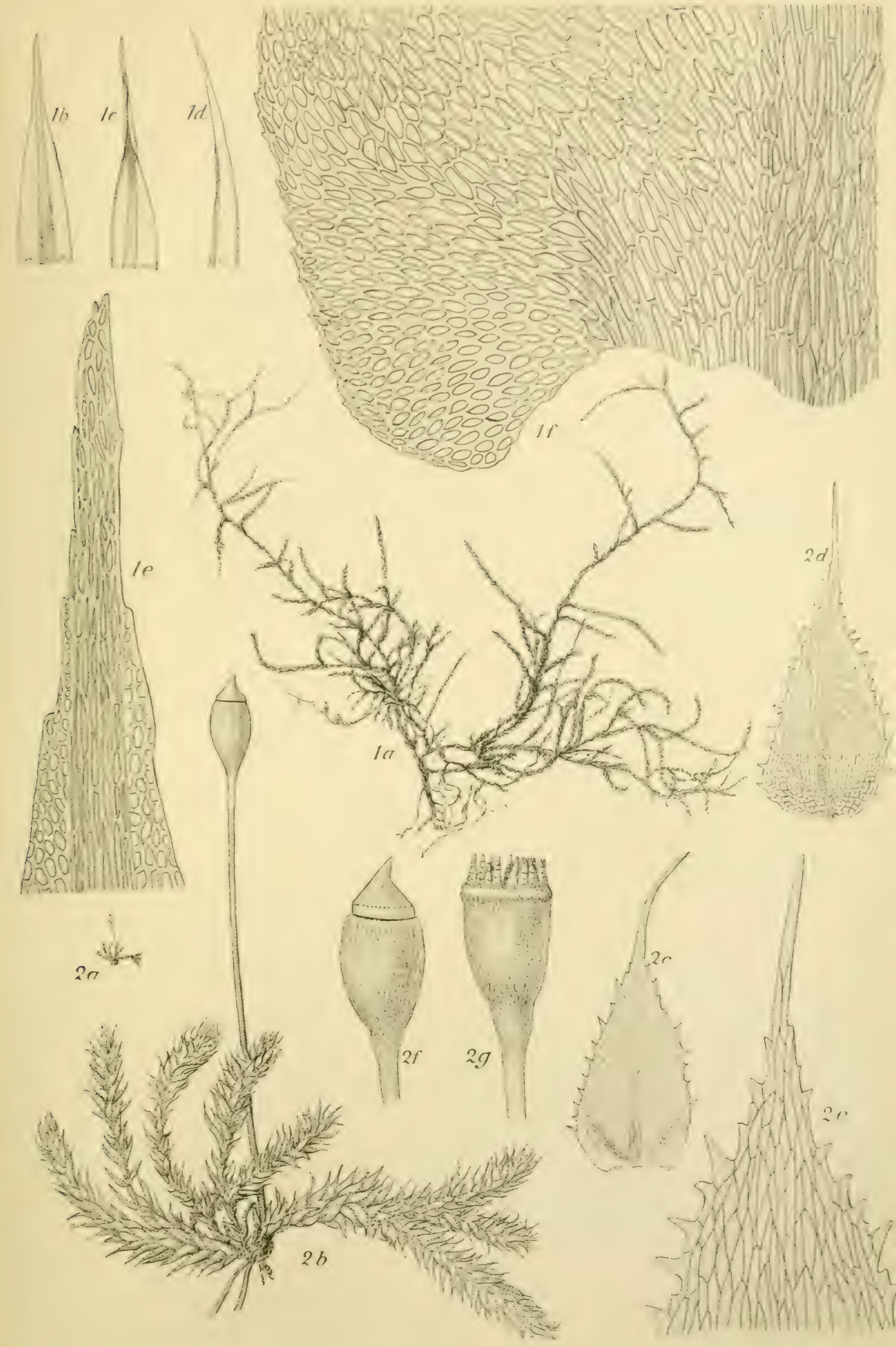

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9. Marine Algae from Easter Island.

By

F. BÖRGESEN.

With 50 text figures.

When Professor SKOTTSBERG asked me to work out his collection of algæ from Easter Island I undertook with pleasure this task, as the isolated situation of this island made its algal flora of a special interest.

The collection consisted of about 20 glasses, a few stones with crustaceous algæ and some dried specimens, mostly the same as contained in the glasses. All the material brought home was collected at low tide between high and low water mark and in one locality, Hanga Piko, on the west coast of the island; sublitoral algæ were only collected in tide-pools.

As is understood from this, it is a small collection only, and as several of the glasses contain the same large species, it was to be expected that the number of species could not be great.

At the examination of the glasses, however, fragments of other larger species were found upon and among the larger algæ, and also some smaller epiphytic and endophytic species. Alltogether 68 species have been listed. Regarding several of these species the material is so scarce that there was hardly enough for microscopic preparation, while it was quite insufficient for a more detailed examination, a circumstance likely to have an influence upon the exactness of the determination.

At all events, the present incomplete list of species shows that this very isolated island possesses a both rich and varied marine flora of which a more thorough investigation, including the sublitoral vegetation, is highly desirable.

If I would try to give my opinion on the more characteristic features of the algal flora, judging from the present material, I might say that many of the species are small creeping ones which by means of strong hapteres or rhizoids are able to fasten themselves to the substratum; such species are f. i. *Gelidium pusillum, Ptilothamnion Pluma, Laurencia claviformis, Chondria repens, Gymnogongrus aequicrassus, Hypnea Esperi, Herposiphonia tenella, Dictyopteris repens* etc. I have also come across proportionally many species of crustaceous algæ. On the whole most of the species are small, the largest one found is *Sargassum* spec. Many species form low tufts and have a cartilaginous

thallus. These different types of the thallus are most certainly adjustments to the very strong surf that continually beats the shores of this extremely exposed island.

As could be expected from the situation of the island, 27° s. Lat., the algal flora has a subtropical character with a few pronounced tropical forms f. i. *Halimeda Opuntia, Valonia ventricosa* and *Chnoospora fastigiata*. No *Caulerpa* was collected.

It is of a special interest to note that some species hitherto known only from the West Indies or adjacent parts of the Atlantic are found at the shores of Easter Island, thus contributing to the remarkable correspondance between the floras of the Pacific and of the West Indies. Regarding this question compare my remarks in »The marine Algæ of the Danish West Indies», vol. II, p. 491 etc.

Finally I want to express my best thanks to the specialists who kindly assisted me with the determination of certain groups. I am much indebted to Mme. Dr. A. WEBER VAN BOSSE and Mme. PAUL LEMOINE for having determined respectively the Squamariaceæ and the Lithothamniaceæ found in the collection, and to Dr. H. E. PETERSEN who took the trouble to name the small fragments found of *Ceramium*.

The drawings are for the most part made by mag. scient. O. ROSTRUP under my inspection.

Chlorophyceae.

Fam. Ulvaceae.

Ulva L.

U. Lactuca L.

LINNÉ, Spec. Plant. II, 1753, p. 1163.

The specimens are small, some few cm high only, forming low tufts, the thallus being folded, crisped and entangled as is often the case with this species on exposed localities.

Area of distribution. Seems to occur in all seas.

Fam. Chaetophoraceae.

Endoderma Lagerh.

E. viride (Reinke) Lagerh. — Fig. 1.

LAGERHEIM, G., Bidrag till Sveriges algflora (Öfvers. af K. Vetensk. Akad. Förh., 1883, p. 75). I. HUBER, Chaetophorées epiphyt. et endophyt. (Ann. Sc. Nat., 7. sér., Bot., tom. 16, 1892, p. 326). BÖRGESEN, F., The Mar. Alg. of the D. W. I., vol. I, p. 10, II, p. 416. — *Entocladia viridis* Reinke, in Bot. Zeit., 1879, p. 476, tab. 6, figs. 6—9.

In the thick walls of *Laurencia claviformis* an *Endoderma* was present, most likely referable to *E. viride*, which according to my concepcion of species

(l. c.) is a rather variable plant. Quite as in the West Indian plants the present one formed a reticular tissue, the endophyte utilising the larger place left above the walls of the peripheral cells in the host plant.

The cells are 8—15 μ long and 7—8 μ broad, of a rather irregular shape, often about oval, mostly as long as broad, but shorter ones are common too.

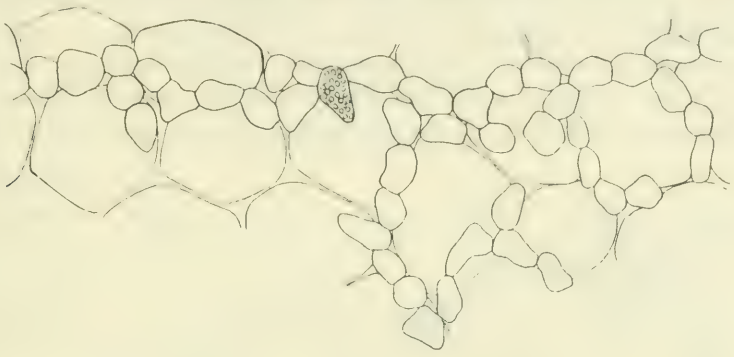

Fig. 1. *Endoderma viride* (Rke) Lagerh. from Laurencia claviformis. In one of the cells zoospores are seen. C. $^{400}/_{1}$.

The cells contain much starch. The shape of the chromatophore could not be determined, probably because the material had been kept too long in formaline.

Cells with zoospores were found now and then.

Area of distribution: Atlantic coasts of Europe and N. America, West Indies, Easter Island.

Fam. Cladophoraceae.

Cladophora Kütz.

C. spec.

Together with *Gelidium pusillum* a small *Cladophora* was found upon a shell. It had vigorous rhizoids deeply immersed in the substratum.

The basal cells were 2—3 mm long and 150—175 μ thick, the upper cells shorter, but a few cells only were developed. The cell walls were thick and stratified.

The largest plant found was 5 mm long.

C. *(Aegagropila)* **socialis** Kütz. — Fig. 2.

Kützing, Spec. Alg., p. 416. Tabulæ Phycologicæ, vol. IV, tab. 71. Reinbold in A. Weber van Bosse, Liste des Algues du Siboga, I Myxophyceae, Chlorophyceae, Phaeophyceae, p. 82.

To this species, originally described by Kützing from Tahiti, I refer a plant forming extensive, soft, *Vaucheria*-like tufts. On the upper side of these tufts the filaments are not much branched, often being quite simple for a considerable distance. The ramification is subdichotomous, the side branches

growing out at acute angles from the mother filaments and soon attaining the same strength as these.

In the upper part of the thallus the cells are of much variable length, 5—10—20 times as long as broad or even more. The diameter of the cells varies from 50—100 μ being mostly 70—80 μ.

The basal parts of the thallus have a different appearance. Here the cells are much shorter, the filaments (Fig. 2 a) are irregularly bent and curved, and much less regularly ramified; and furthermore we find here a great number of rhizoids. These rhizoids serve for the most part to attach the plant to the substratum but also to keep the whole thallus together as many of them fasten

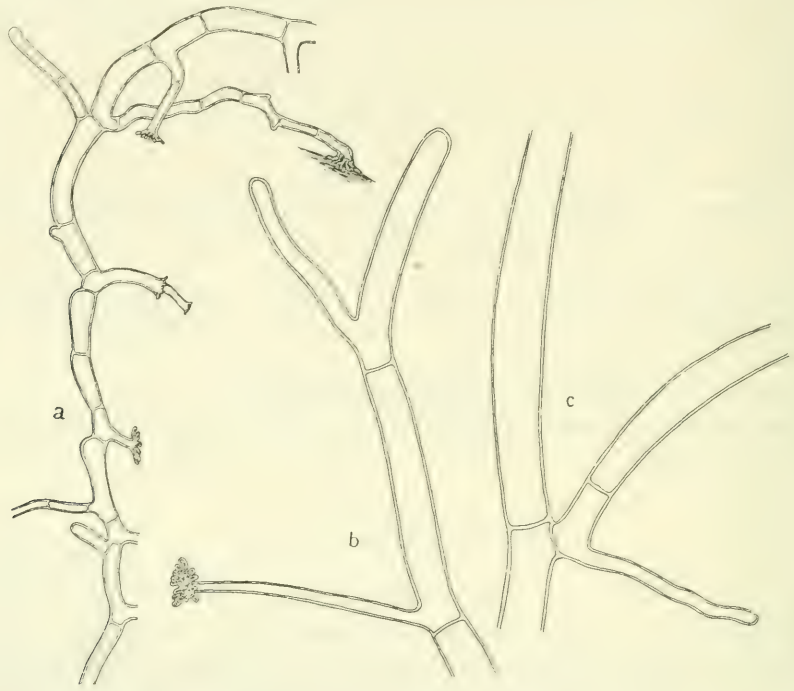

Fig. 2. *Cladophora socialis* Kütz. Parts of plants showing ramification and formation of rhizoides. a c. $^{30}/_{1}$, b, c c. $^{65}/_{1}$.

themselves to other filaments. The rhizoids are sometimes long, sometimes short; in the long one cross walls are often present while the short ones have no cross walls. They generally end in a small coralliform disc. There is no cross wall separating the rhizoid from its mother cell.

The wall of the filaments is thin in the young parts of the thallus, thick and stratified in the older parts.

By its ramification and mode of growth as well as by the fact that the rhizoids are not cut off from their mother cells by cross walls this plant at the first glance reminds rather much of *Cladophoropsis*, but it is of course easily distinguished by the presence of cross walls at the base of the branches. Furthermore it must be remembered that the formation of cross walls in the filaments of *Aegagropila* takes place in the same way as f. i. in *Cladophora*,

while cell division in *Cladophoropsis* (as far I have been able to observe on preserved material of *Cl. membranacea*) is realised in the peculiar way I have called segregative cell division.

The species, originally found at Tahiti, has been collected at the Lucipara Islands by Mme. WEBER.

Area of distribution: Pacific Ocean, Malay Archipelago.

Fam. Valoniaceae.

Valonia Ginn.

V. ventricosa J. Ag.

Specimens as large as dove's eggs are found. They were fastened to other algæ and were also themselves very much utilized by epiphytes.

The specimens seem to agree very well with others collected by me in the West Indies (l. c., vol. I, p. 27). In both cases they were fastened to the substratum by means of rhizoids growing out from the small lentiform cells in the basal end of the large cell.

In some of the specimens a good number of small roundish cells were found enclosed in the large mother cell, as described by MURRAY.[1] On the base of my West Indian material I arrived at the conclusion that these bodies owed their origin to abnormal conditions, but after I have seen the Pacific specimens I agree with MURRAY in considering them as quite normal organs of vegetative reproduction formed by a kind of free cell division — segregative as I have called this peculiar division modus found in so many related tropical forms.

Another sample of algæ contained some few specimens of more elongated shape about 2 cm long and $^3/_4$—1 cm broad. I dare not say, if these specimens more rightly ought to be referred to *V. Forbesii* Harv. but had they come from the West Indies I would without doubt have considered them as forms of *V. ventricosa*. As is the case in this species they were covered by epiphytes, especially *Melobesiaceæ*, while *V. Forbesii*, according to Mme. WEBER[2], is less used as substratum.

Area of distribution: West Indies, Malayan Archipelago, Tahiti, Easter Island.

Rhipidiphyllon Heydr.

Rh. reticulatum (Asken.) Heydr. — Fig. 3, 4.

HEYDRICH, F., Beiträge zur Kenntnis der Algenflora von Ost-Asien besonders der Insel Formosa, Molukken- und Liu-kiu-Inseln. Hedwigia, 33. Bd., 1894, p. 281. — *Anadyomene reticulata* Askenasy, Forschungsreise S. M. S. »Gazelle» IV. Theil, Botanik (Algen), p. 5.

The thallus (Fig. 3) forms small, 2—4 mm broad, cristate and excentric bodies fixed by means of vigorous rhizoids to the host plant *(Galaxaura)*.

[1] MURRAY, G., On Halicystis and Valonia, in MURRAY, Phycological Memoirs, Part II, 1893, p. 50—1.

[2] WEBER-VAN BOSSE, A., Liste des algues du Siboga, I, Myxophyceae, Chlorophyceae, Phaeophyceae, p. 59.

Fig. 3. Young plant of *Rhipidiphyllon reticulatum* (Asken.) Heydr., c. $^{50}/_{1}$.

The rhizoids grow out from the lowermost ends of the cells in the basal part of the plant (Fig. 4 b). They are irregularly bent and have thick walls. They grow downwards along the wall of the main cells and contribute highly to the strengthening of these. Reaching the host plant they become divided in several thinner filaments which are terminated by irregular coralliform lobes. I have not seen any cross walls in these rhizoids. From the base of the main cells even high up in the thallus such rhizoids are formed.

The growth of the plant is acropetal. The young cells are at first seen as small outgrowths upon the end of the mother-cell. These outgrowths are often rather large before they become separated by a wall (comp. Fig. 3). The ramification always takes place in the same plane.

When the apex of a cell touches the neighbour branch it becomes fastened to it by a thick cellulose ring, formed in the same way as in *Microdictyon umbilicatum* (Fig. 4 a).

The large cells are about 200 μ wide and as much as 600 μ long. The cells contain a wall plasma with numerous chromatophores forming a dense network. Numerous pyrenoids are regularly distributed in the chromatophores.

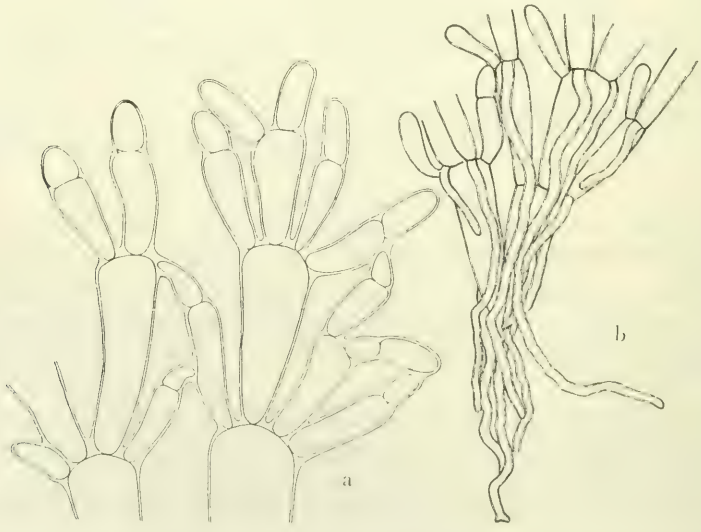

Fig. 4. *Rhipidiphyllon reticulatum* (Asken.) Heydr. **a** summit of plant, c. $^{60}/_{1}$; **b** base of small specimen, c. $^{30}/_{1}$.

The flabelliform mode of ramification reminds very much of *Anadyomene*, but in *Rhipidiphyllon* the space between the large cells remains open no small cells being formed here. ASKENASY described the plant as an *Anadyomene*, but I think HEYDRICH was right in making it the type of a new genus.

Rhipidiphyllon differs from *Microdictyon* mainly by its acropetal, fanshaped ramification resulting from the fact that the new cells are produced from the upper end of the mothercell, all being directed upwards under acute angles and all lying in the same plane. It also differs in the less regular and less frequent junction of the cells. *Rhipidiphyllon* is also a much smaller plant; the largest specimens I have seen are about 5—6 mm in diameter, as stated by ASKENASY.

It seems to me rather doubtful if the plant so beautifully figured by OKAMURA in his »Illustrations of the Marine Algæ of Japan», Vol. 1, no. 6, pl. 30 really belongs to this genus. I am much more inclined to consider this a *Microdictyon*. The shape of the thallus, the mode of ramification, the shorter and less marked main cells, the more spreading branches, not distinctly gathered at the end of the main cells with much larger angles between them, and the lowermost being directed downwards, all suggests *Microdictyon*.

Area of distribution: West Australia, Formosa, Easter Island.

Microdictyon Dcne.

M. umbilicatum (Vell.) Zanard. — Fig. 5.

ZANARDINI, Iconographia, Phycologica Adriatica, vol. I, p. 79, tab. XIX, 1860.

Some few small fragments were found growing on *Hypnea*.

Regarding the limitation of species in *Microdictyon* there still is some uncertainty, as pointed out by REINBOLD.[1] In the treatise quoted below he points out that the network arises in three different ways, namely by means of a simple anastomosis (»Verdickungsring», BITTER) as is the case in *M. umbilicatum*, by pseudohapters, the attach-

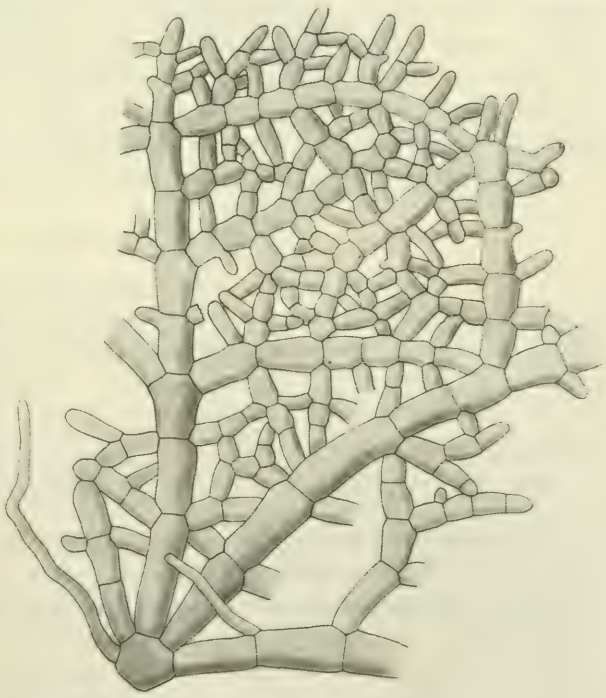

Fig. 5. *Microdictyon umbilicatum* (Vell.) Zanard., part of specimen, c. $^{25}/_{1}$.

[1] REINBOLD, TH., in A. WEBER VAN BOSSE, Liste Algues Siboga, I, p. 66.

ment points being crenulated cell-ends as is the case in *M. pseudohapteron* Gepp and finally by means of true tenacula as found in *M. Montagnei* Dcne.

Regarding the mode of net formation the present plant quite agreed with *M. umbilicatum* and therefore I do not hesitate to refer it to this species. It agrees very well with my West Indian specimens and specimens from Cadiz.

Area of distribution: Mediterranean Sea, West Indies, Red Sea, Australia, Sandwich Islands etc.

Fam. Codiaceae.

Halimeda Lamx.

H. Opuntia Lamx. forma **Reinschii** (Hauck) Barton.

Barton, E. S., The genus Halimeda, p. 21. Okamura, K., Icones, vol. III, pl. 148. — *Halimeda Reinschii* Hauck, Ueber einige von I. M. Hildebrandt im Rothen Meere und Indischen Ocean gesammelte Algen. (Hedwigia, 1886, p. 167.)

The specimens gathered seem to agree very well with the description of Hauck and the figures of Mrs. Gepp (Miss Barton). It is a rather small plant forming compact tufts ca. 5—6 cm high. The base consists of a short stem from which branches are issued in all directions. The lowermost joints are often broader than long and very thick, followed by a few ones nearly cylindrical and longer than broad, but soon the joints again become shorter, broader than long and trilobed. Higher up again the joint grow smaller, thinner, nearly roundish or ovate and sometimes Hightly trilobed, sometimes not. The midrib is very indistinct. The joints in the lower part are mostly about 2—3 mm long and 3—4 mm broad, higher up 5—6 mm long and 4—5 mm broad; the uppermost are about 4 mm high and 3 mm broad.

Area of distribution: Indian Sea, Easter Island.

Fam. Phyllosiphonaceae.

Ostreobium Born. et Flah.

O. Quekettii Born. et Flah.

Bornet, E. et Ch. Flahault, Sur quelques plantes vivant dans le teste calc. des Mollusques (Bull. Soc. bot. Fr., T. 36, 1889).

This species was found in a small *Spirorbis,* the shell being quite green-coloured by the occurrence of the alga.

Area of distribution: Europe, North America etc. most likely cosmopolitan.

Phaeophyceae.

Fam. Ectocarpaceae.

Ectocarpus Lyngb.

E. Chnoosporae nov. spec. — Fig. 6.

Thallus pulvinulos parvos ca. 1 $^1/_2$ mm latos formans, e filis repentibus et filis erectis constructus. Fila repentia irregulariter ramosa et plus minus coherentia e cellulis oblongis ca. 15—20 μ. latis et 24—28 μ. longis composita. Fila

Fig. 6. *Ectocarpus Chnoosporae* nov. spec., parts of plants, c. $^{200}/_1$.

erecta ca. 1 mm alta, in parte basali e cellulis 8—10 μ. latis et 25—30 μ. longis in superiori parte e longioribus formata, simplicia aut in inferiori parte ramosa; rami aut longi, erecti, aut breves sporangia plurilocularia gerunt. Sporangia subfusiformia, ca. 100 μ. longa et 25 μ. lata.

On the thallus of *Chnoospora fastigiata* J. Ag. var. *pacifica* J. Ag. a small brown alga was found which seems to me most naturally to come near the crustshaped *Ectocarpi* quoted by OLTMANNS, Morphologie u. Biologie der Meeresalgen, 2. edition, p. 10, mentioned from the posthumous manuscript of KUCKUCK. As examples of the gradual reduction of the thallus of *Ectocarpus* he mentions two species, *Ectocarpus faeröensis* and *speciosus*, originally described by me under *Myrionema* in accordance with the at that time recent work of SAUVAGEAU on the Myrionemaceae. Later, these species were referred to various genera by various investigators; now KUCKUCK simply has included them in *Ectocarpus*.

The basal part of the plant consists of a monostromatic tissue composed of irregularly curved and ramified creeping filaments growing gradually more or less tightly together. The cells of the basal layer are about 15—20 μ thick and 24—28 μ long. From these cells erect filaments arise. These are mostly simple having a zone of growth somewhat above their base. Here the cells are short with intercalary divisions. Upwards they gradually increase in length, the chromatophores become less developed and the ends of the filaments become hairlike, gradually dying off.

These assimilating filaments measure about 8—10 μ at their base, the length of the cells being 25—30 μ. In the zone of divisions the cells are about 16 μ wide and mostly shorter than long. Keeping about the same width the upper cells attain length of about 65 μ. The filaments are up to 1 mm long. Most of the assimilating filaments are simple but sometimes carry a single equally developed branch near their base; in the upper part they are always undivided. Near the base they also carry short filaments bearing terminal plurilocular sporangia. These filaments consist mostly of a single or of two cells. Now and then, too, a plurilocular sporangium is borne on a short filament arising directly from the basal filaments.

In one specimen (Fig. 6 b) two small sessile gametangia were observed at some distance from the base and one sporangium on each of the filaments, somewhat recalling the genus *Gononema* Kuck. und Skottsb.[1] The plurilocular sporangia are ovate-spindleshaped, about 100 μ long and 25 μ broad. In the fresh divided cells, the chromatophores form several roundish discs, in the older cells oblong bodies or short staffs.

This new *Ectocarpus* evidently comes near *Compsonema fasciculatum* and *C. coniferum*, described by SETCHELL and GARDNER in Phycological Contributions II to IV (University of California Publications, vol. 7, 1922), but the present plant is much larger and also shows several differences in the shape of sporangia, assimilatory filaments etc.

Area of distribution: Endemic.

E. breviarticulatus J. Ag. — Fig. 7.

I. AGARDH, Nya alger från Mexico (Öfversigt af K. Vetensk.-Akad. Förhandl., 1847, p. 7). BÖRGESEN, F., Marine Algae of the D. W. I, vol. I, p. 173. — *Ectocarpus hamatus* Cr. in MAZÉ et SCHRAMM, Essai de classification des algues de la Guadeloupe, 2e Edit. 1870—77, p. 111; VICKERS, A., Phycologia Barbadensis, part 11, pl. 29.

The specimens found quite agree with the West Indian plant.

The filaments are about 30 μ thick. The length of the cells is rather variable. Near the summit of the filaments and generally in the periphery of the tufts the cells mostly are about as long as broad, while in the main filaments in the interior of the tufts the cells are often more than twice as long as broad.

[1] SKOTTSBERG, C., Bot. Ergebnisse d. schwed. Exp. nach Patagonien und dem Feuerlande. VIII. Marine Algae. 1. Phaeophyceae, p. 9.

The plurilocular sporangia (Fig. 7 b) are roundish-quadrangular or obovate. Commonly they are about 40 μ long and 35 μ broad as is also the case in the West Indian form, the measure given by me (l. c.) drawn from a rather large sporangium.

So far one is able to judge from material kept so long in formaline, there appears to be several shorter or longer ribbon-like chromatophores, irregularly bent and with branches of different length in the young parts of the filaments, while in the older ones the chromatophores are more like small roundish or somewhat irregularly shaped discs.

From Mrs. GEPP's description and figures[1] of *Ectocarpus spongiosus* Dickie[2] I feel convinced that this species is the same as *E. breviarticulatus*, originally described by I. AGARDH in 1847 on specimens collected by LIEBMANN at St. Augustin, Mexico.

Area of distribution: Pacific coast of Mexico, West Indies, Indian Ocean, Easter Island.

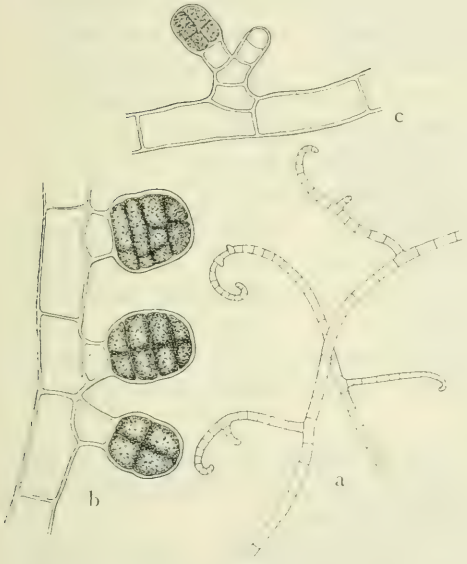

Fig. 7. *Ectocarpus breviarticulatus* J. Ag. **a** sterile filaments, c. $^{45}/_{1}$; **b** (c. $^{250}/_{1}$) and **c** (c. $^{200}/_{1}$) pluriocular sporangia.

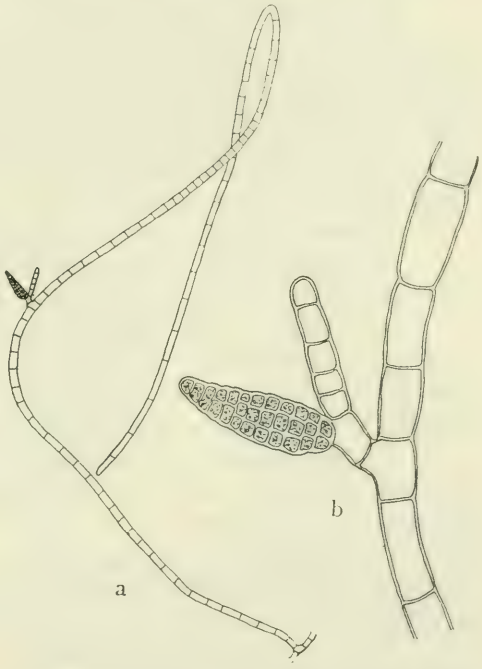

Fig. 8. *Ectocarpus* sp. **a** filament with plurilocular sporangium, c. $^{45}/_{1}$; **b** the sporangium, c. $^{200}/_{1}$.

E. spec. — Fig. 8.

The figure represents all the material found, and I would not have mentioned the plant if it had not shown so much likeness to another »*Ectocarpus* spec.» mentioned by Mme. WEBER in the »Phaeophyceae of the Siboga», p. 131.

[1] BARTON, ETHEL S., List of Marine Algae collected at the Maldive and Laccadive Islands by I. S. Gardiner (Journ. Linn. Soc.-Bot., vol. 35, p. 479).

[2] DICKIE, G., On the Algae of Mauritius (Journ. Linn. Soc., Bot., vol. 14, 1875, p. 191).

The plant was attached to *Nitophyllum* spec. From the decumbent short filament, the long erect one arises. At the base the filament was 12 μ thick, somewhat higher up 19 μ, a litle above the sporangium 24 μ. Along the intercalary growth-zone the width is about 23 μ; from here the filament evenly tapers into a pseudo-hair like prolongation with cells about 15 μ thick and 80 μ long.

The plurilocular sporangium is ovate fusiform, 80 μ long and 24 μ broad. It was placed upon the basal cell of a short branch. In the plant of Mme. WEBER the sporangia are sometimes sessile, sometimes placed upon a short pedicel.

Fam. Ralfsiaceae.

Mesospora Weber van Bosse.

M. Van-Bosseae nov. spec.[1] — Fig. 9.

Thallus 2—3 cm et ultra altus e disco basali et filis erectis constructus. Discus basalis e filis repentibus coherentibus subdichotomo divisis compositus unde fila erecta oriuntur. Fila erecta in parte basali e cellulis latioribus quam altis et plus minus cohaerentibus stratum subparenchymaticum formantibus, in parte superiori libera, subclavata e cellulis cylindricis ca. 24 μ longis et 8—11 μ latis, ad apicem versus cellulis gradatim latioribus ad 16 μ latas composita.

Sporangia plurilocularia in superiori parte filorum formata.

Through the great kindness of Mme. WEBER I have been able to compare my plant with original material from the Siboga-Expedition.

By means of this and the detailed description of Mme. WEBER I have convinced myself that the plant from Easter Island, even if it agrees with the Malayan one in many respects, nevertheless differs essentially in others, making it necessary to regard it as a new species.

The plant grows on stones to which it adheres firmly with its whole lower surface. It forms dark brown or nearly black crusts as much as 2—3 cm in diameter or even more.

The basal part of our plant is formed of several brown layers of old decayed tissue, often including blue green algae, in transverse section presenting a picture very like that found in fig. 43 of Mme. WEBER.

I have succeeded in finding a small marginal portion, represented in fig. 9 b. It is composed of creeping, congenital filaments growing in length by means of a top-cell. By transverse walls these filaments are divided into more or less isodiametric cells. The filaments are about 10—15 μ thick, the top-cell often 20 μ or more. The filaments are radiant to all sides and by and by, as the disc expands and the width of the outermost ends of the filaments increases the cells show longitudinal walls, the filaments thus becoming dichotomously divided.

At a very early stage erect filaments arise from every cell of the basal stratum. These erect filament grow vertically, standing quite close together.

[1] I have the great pleasure to name this species in honour of Mme. Dr. A. WEBER VAN BOSSE, the indefatigable explorer of the algal flora of the Malayan Archipelago.

In the basal part the cells are broader than long and more or less coherent, forming a nearly parenchymatic tissue (Fig. 9 a). While this horizontal layer in Mme. WEBER's plant is composed only of 1—4 layers of cells, ten or even more are not uncommon in my plant. The cells are considerably broader than long, ca. 18 μ broad and only 7 μ high. The filaments composed of these cells are now and then dichotomously divided; generally they are vertical, but now and then parts of the tissue occur with curved filaments.

Above this tissue the filaments become thinner and at the same time mutually free in their whole length. In this respect our plant differs essentially

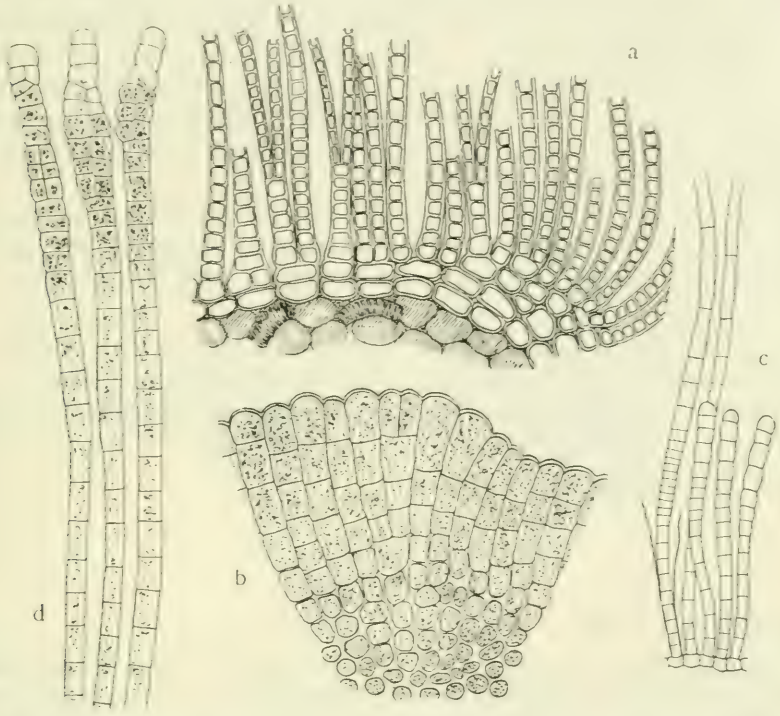

Fig. 9. *Mesospora Van-Bosseae* nov. spec. **a** transverse section of thallus, c. $^{200}/_{1}$; **b** part of margin seen from above, c. $^{150}/_{1}$; **c** assimilating filaments and hairs, c. $^{150}/_{1}$; **d** formation of plurilocular sporangia, c. $^{200}/_{1}$.

from that of Mme. WEBER, who describes her plant in the following way: »Les filaments verticaux, claviformes qui la composent ont de 10—20 cellules, ils sont libres dans la partie basale et mediane, mais adhèrent fortement entr'eux au sommet, couvert d'une couche mucilagineuse assez épaisse». In our plant as explained above the basal parts of the filaments adhere rather firmly while upwards the filaments become quite free, only imbedded in mucilage.

At the base of the free part of the filaments the cells are cylindrical and as much as 24 μ long and 8—11 μ wide; higher up the cells grow shorter, mostly broader than long, the width of the filaments being about 16 μ. The filaments consist of about 20—30 cells. Thus, they are a good deal longer than in *Mesospora Schmidtii;* furthermore the shape of the cells is

different, being nearly cylindrical with thin walls in our plant, while, in Mme. WEBER's plant, they are barrelshaped and thickwalled.

Now and then groups of hairs occur (Fig. 9 c); the hairs are about 10 μ thick at the base and composed of cells longer than broad; their growth-zone lies a little below the surface of the thallus and consists of quite short cells, densely filled with protoplasm and chromatophores; thence the cells quickly become long and colourless. At their base the hairs are covered by a single or some few sheaths.

Unilocular sporangia were not present.

On the other hand I have found some structures (Fig. 9 d) in the upper end of the filaments, similar to those observed by Mme. WEBER who regards them to be plurilocular sporangia. In my material they were not so regularly divided as in the Indian plant. They very much reminded of those found by me in *Ralfsia expansa*.[1] In spite of a diligent search I have not succeeded in finding emptied plurilocular sporangia, but nevertheless I feel convinced that we have to do with such organs.

By reason of the thick walls in *Mesospora Schmidtii* a bursting of the wall takes place at the formation of the plurilocular sporangia as is easily seen in the drawings of Mme. WEBER, in our plant with its thin walls such a bursting is not visible.

The cells contain an irregularly lobed and bent plate-like chromatophore in which a single or two refractive pyrenoid-like bodies are present. In one of the specimens, sometimes in almost every filament, a cell with homogeneous, yellow brown contents was found.

Area of distribution: Endemic.

Ralfsia Berk.

R. expansa J. Ag.

AGARDH, J., Spec. Alg., vol. 1, p. 63. BÖRGESEN, F., Two crustaceous brown algae from the Danish West Indies (Nuova Notarisia, Serie 23, 1912, p. 123).

The specimens found are not quite typically developed and I have hesitated to decide whether they are most naturally referable to *R. verrucosa* or to *R. expansa*. It must be remembered that REINKE, in »Algenflora» p. 48, mentions that he has found a marked bilaterality in specimens of *R. verrucosa* from Cherbourg.

Now, a transverse section of one of the specimens found mostly showed no bilaterality at all while in the other specimen contained in the collection this character vas better developed, being often in good accordance with the figure of Mme. WEBER. As compared with my West Indian specimens the Pacific ones had upon the whole a much thinner thallus.

In one of the specimens unilocular sporangia were present; they were about 24 μ broad and 65 μ long, in shape and size approaching those I have found in specimens from St. Thomas (l. c. fig. 2 a). At the base of the sporangia a small cell was present just as in the West Indian plant; as I have

[1] Compare my figure 148 c in »Marine Algae of the D. W. I.», vol. I, p 191.

pointed out (l. c.) this pedicel is not mentioned in the description of KUCKUCK[1] nor figured in REINKE's Atlas, pl. 5—6; but it is present in HARVEY's figure in »Phycologia Brit.», pl. 98; this character is, perhaps, not a reliable one.

Area of distribution: West Indies, Malayan Archipelago, Easter Island.

Fam. Elachistaceae.

Elachista(?) spec. — Fig. 10.

On an old basal part of a *Sargassum*(?) a small brown alga was found which might perhaps be referred to the genus *Elachista* as it shows a good

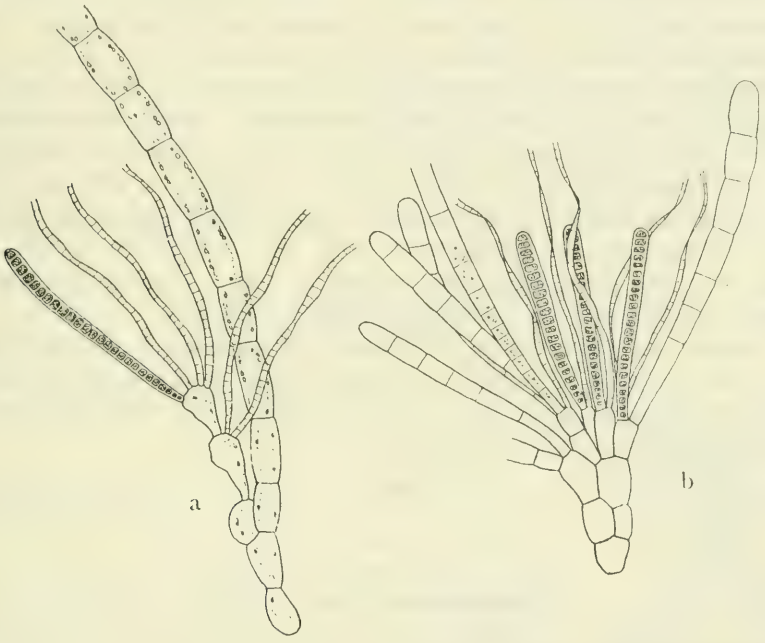

Fig. 10. *Elachista*(?) spec. Fragments with assimilatory filaments, mature and empty plurilocular sporangia; in **b** the basal part of a hair. C. $^{250}/_{1}$.

deal of likeness to *Elachista rosarioides* and *E. pusilla* described by SKOTTSBERG in Bot. Ergebn. d. schwed. Exp. nach Patagonien und dem Feuerland, 1907—9, VIII. Marine Algae, 1. Phaeophyceae, p. 21—23.

The plant forms small tufts. The basal part is endophytic, consisting of thin-walled, more or less barrel-shaped cells, about 15 μ wide and of almost the same length.

From the basal part arise hairs, long assimilating filaments, and shorter fertile branches.

The assimilating filaments are rather thin at their base, about 4—7 μ, with cells up to 30 μ long. Upwards the thickness increases to about 12—18 μ; at the same time the cells are proportionally shorter as they mostly keep the

[1] KUCKUCK, P., Bemerkungen zur marinen Algenvegetation von Helgoland, I, p. 244.

same length as found in the thinner part of the filament. In the young yet growing filaments the zone of cell division lies a little above their base, where shorter cells with rich contents are observed. The cells contain a number of roundish, oval, discformed chromatophores. The length of the vegetative filaments is about 300 μ.

The fructiferous filaments are branched from their base and composed of very irregular thin-walled cells. These cells are more or less pear-shaped, thin below and broadly rounded above, where often several branches are given off. The cells are about 8—12 μ broad and 20 μ long. From the uppermost of these cells the plurilocular sporangia arise. The sporangia are almost cylindrical, uniseriate, about 8 μ thick and up to 200, generally 150 μ long. The remains of empty sporangia are long preserved. When a sporangium is emptied a new one is formed at the side of the other one, and one cell may often bear 5—6 or more emptied sporangia besides a sporiferous one.

Unilocular sporangia were not observed. Hairs occur, but were not common.

As mentioned above the present plant seems to show some likeness to the *Elachista*-forms, described by SKOTTSBERG.[1] Also the Easter Island plant is more or less endophytic and shows no difference between assimilating filaments and paraphyses, contrary to *E. fucicola*. Particularly it seems to agree with a plant from Station 17 b of SKOTTSBERG (fig. 10 c) but differs by the narrower sporangia and the more cylindrical vegetative cells. Further, the assimilating filaments in the plant from the Easter Island are shorter.

It cannot be denied that the present plant shows a striking likeness to *Myriactis moniliformis* (Fosl.) Kylin, and highly favours the supposition of SKOTTSBERG that all these forms, even if they do not belong to one genus, must be regarded as nearly related to each other.

Fam. Encoeliaceae.

Colpomenia Derb. et Sol.

C. sinuosa (Roth) Derb. et Sol.

DERBÈS, A., and A. I. I. SOLIER, Mémoire sur quelques points de la Physiologie des Algues, p. 11 (here incorrectly called *sinuata*); BÖRGESEN, Mar. Algae of the D. W. I., vol. I, p. 176. — *Ulva sinuosa* Roth, Catalecta Botanica, III, p. 327, tab. XII.

Some few large specimens were present in the collection. They were fertile with plurilocular sporangia in irregular groups scattered over the surface of the thallus, as in the West Indian specimens. Still, there are some points of difference. For instance, I have not been able to find any club-shaped paraphyses so nicely developed in the West Indian form (comp. my fig. 138) and described by MITCHELL in MURRAY's Phycological Memoirs, p. 53.

Further, according to MITCHELL and my own observations the plurilocular sporangia are formed round the cryptostomata, while in the material from

[1] Professor SKOTTSBERG kindly sent me some slides of these species so I have been able to compare my plant with the authentic material.

Easter Island the sori do not seem to be restricted to the vicinity of these but are formed everywhere on the surface of the thallus. Otherwise, the Pacific specimens agree very well with West Indian ones.

Area of distribution: Widely spread in all warmer seas.

Hydroclathrus Bory.

H. cancellatus Bory.

Bory, Dict. class. VIII, p. 419. Harvey, Phycologia Australica, pl. 98; Nereis, p. 120, tab. IX A. Thuret et Bornet, Études phycologiques, 1878, p. 12. Mitchell, M. in Murray, Phycol. Memoirs, p. 53.

The specimens found agree very well with West Indian plants. The thallus consists of a medulla of large roundish-polygonal cells, and a small-celled cortex. Where two strings of the network come into contact the epidermal cells grow out in a rhizoid-like fashion, uniting in this way different parts of the net work of the thallus. Compare my fig. 139, l. c. The material was sterile.

Area of distribution: Seems to occur in all warm seas.

Chnoospora J. Ag.

C. fastigiata J. Ag. var. **pacifica** J. Ag. — Fig. 11, 12.

Agardh, J., Spec. Alg., vol. 1, 1848, p. 171. — *Chnoospora pacifica* J. Ag., Nya alger från Mexico (Öfvers. K. Vetensk.-Akad. Förh., 1847, p. 7).

Some small specimens of a brown alga, richly provided with cryptostomata, from which long hairs protrude giving the plant a nearly moniliform appearance, seem to be referable to the genus *Chnoospora* as a small form of *Chn. fastigiata* var. *pacifica*.

The largest specimen was about 6 cm high, the others 4 to 5. The plant is fastened to the substratum by means of a rather large irregularly shaped disc from which the erect shoots arise.

The ramification is mostly dichotomous, sometimes tri-polychotomous but rather irregular, with the whole branch system more or less fastigiate, even if a tendency to lie in the same plane is rather obvious.

In the basal part the branches are about 1 mm thick, rarely more, higher up thinner. The thallus is a little compressed, the transverse section being oval.

Fig. 11. *Chnoospora fastigiata* J. Ag. Part of a plant, c. $^2/_1$.

Scattered over the whole surface there are cryptostomata, generally rather shallow depressions, from the bottom of which hairs grow out to form rather long and dense, brushlike tufts. The blunt summit of the thallus has no hair-groups contrary to SKOTTSBERG's *Cladochroa*.

A transverse section of the thallus (Fig. 12 d) exhibits a cortical layer of oblong or short cylindrical cells, having nearly the same aspect on a longitudinal section; the parenchymatic tissue inside consists of rather thickwalled cells, oblong to subcylindrical in longitudinal, more sphærical in transverse sections.

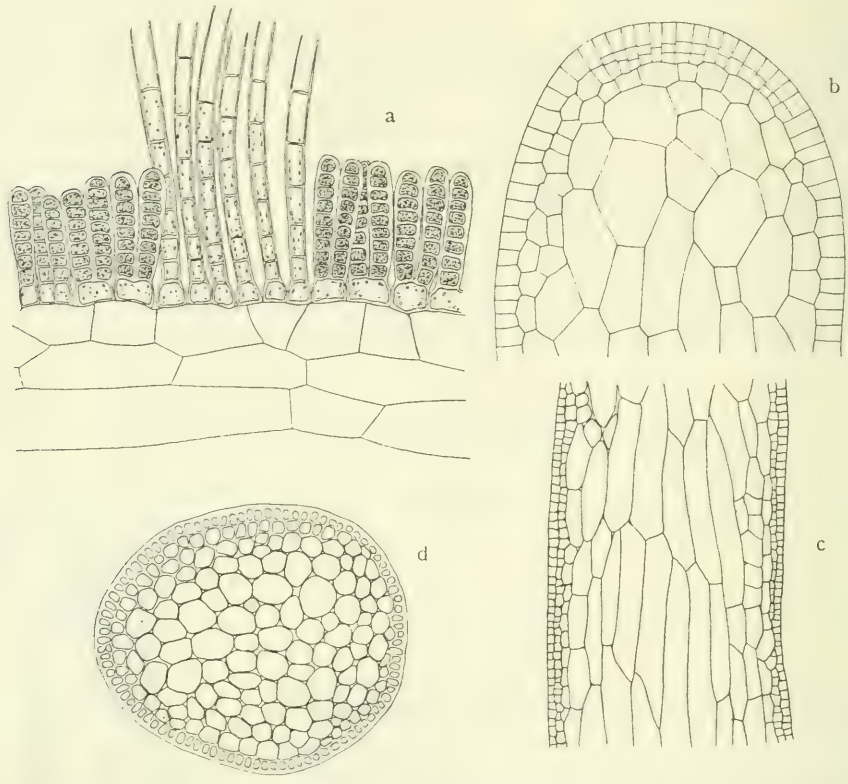

Fig. 12. *Chnoospora fastigiata* J. Ag. a Transverse section of the thallus with plurilocular sporangia and hairs, c. $^{400}/_{1}$; b longitudinal section of apex of a branch, c. $^{300}/_{1}$; c longitudinal section of thallus, c. $^{140}/_{1}$; d transverse section of thallus, c. $^{140}/_{1}$.

In the growth-point no marked top cell is present. As figure 12 b shows, the longitudinal growth takes place by means of a series of cells at the apex of the filaments, the lower part of these cells being gradually cut off.

The figure of the growth point in our plant is very like those of *Scytothamnus australis* and *Coilodesme bulligera* (comp. OLTMANNS, Morphologie und Biologie der Algen, vol. II, 1922, p. 62) as drawn by KUCKUCK and found among his posthumous prepatory notes to the great work on the Phaeophyceae that was never completed, much to the regret of all algologists. According to OLTMANNS the notes of KUCKUCK regarding this matter are quite fragmentary.

As to the fructification this has been cleared up long ago by the late Mrs. GEPP.[1] The plurilocular sporangia (Fig. 12 a) are formed around the trichostomata; the surface cells grow out to cylindrical or somewhat clavate bodies which are divided by transverse walls into small cells in which the gametes are formed.

Area of distribution: *Chnoospora fastigiata* has been found in several localities in the Pacific and on the coast of Venezuela in the Atlantic Ocean.

Fam. Sphacelariaceae.

Sphacelaria spec.

Only some few sterile filaments, even without propagula, were observed; they cannot be determined.

Fam. Dictyotaceae.

Dictyopteris Lamx.

D. repens (Okamura). — Fig. 13.

Haliseris repens Okamura, List of Marine Algae collected in Caroline and Marianne Islands, 1915 (Bot. Magaz., vol. 30, 1916, p. 8, pl. 1, figs. 7—18).

This pretty little plant was found creeping upon the base of *Galaxaura paschalis* and other algae. The specimens found seem to correspond very well with the description of OKAMURA. The thallus consists of two layers of cells except in the midrib (Fig. 13 a); a sclerenchymatic rib along the margin of the thallus, as found in *D. delicatula*, is not present here. Besides this difference it further differs from the West Indian plant, to which it otherwise shows a great resemblance, by the fact that the hair-groups, well developed and regularly scattered in the West Indian plant, are mostly wanting in the Pacific one or, when present, poorly developed and placed without order.

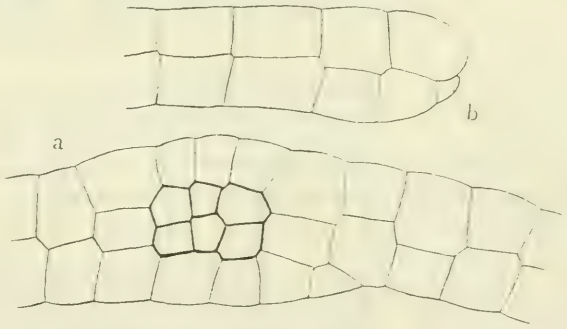

Fig. 13. *Dictyopteris repens* (Okam.) Cross sections of thallus, a through the midrib, b through margin. c. $^{200}/_{1}$.

Rhizoids like those in the W. I. plant are frequent; they grow out from the midrib and from the margin of the thallus. The rhizoids have a long stalk composed of cells about 100 μ long and 33 μ broad being somewhat narrowed at the cross walls. They end in a small coralliform disc.

Unfortunately all the material was sterile.

Area of distribution: Pacific Ocean

[1] BARTON, ETHEL S., On the fruit of Chnoospora fastigiata J. Ag. (Journ. Linn. Soc., Bot. vol. 33, 1897/8, p. 507, pl. 28).

Zonaria Drapern.

Z. variegata (Lamx.) Mert. — Fig. 14.

MERTENS in MARTIUS, Icones plant. cryptog., p. 6, tab. 11, fig. 11. RICHARDS, H. M., Notes on Zonaria variegata Lamx. (Proc. of the Amer. Acad. of Arts and Sciences, 1890). SAUVAGEAU, C., Observations sur quelques Dictyot. et sur un Aglaozonia nouveau (Bull. de la Station biol. d'Arcachon, 8 année, 1904—05). BÖRGESEN, F., Marine Alg. D. W. I., vol. I, p. 197. — *Dictyota variegata* Lamx., Essai, p. 57, tab. V, figs. 7—9. *Gymnosorus variegatus* (Lamx.) J. Ag., Analecta algol., cont. I, p. 11, 1894.

The specimens collected agree very well with those from the West Indies. They are 7—8 cm in diameter or even more; when dried they have a dark nearly black-brown colour and their consistency is tough and rather stiff.

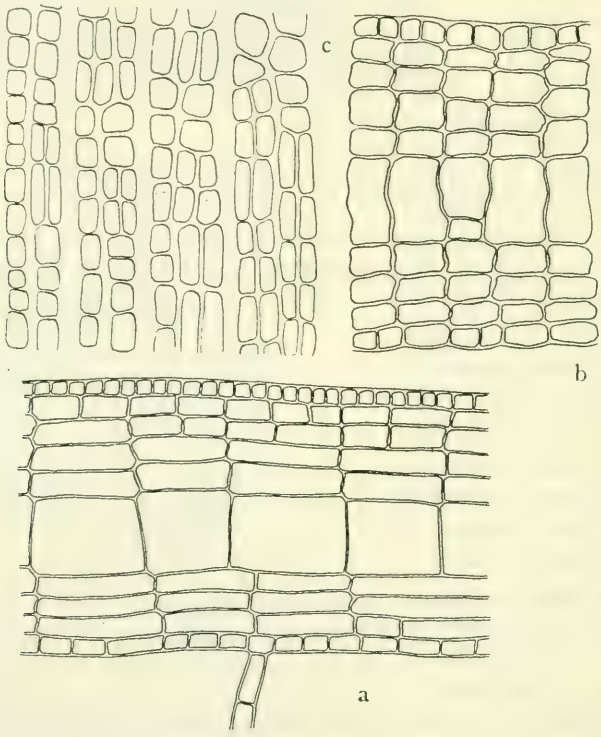

Fig. 14. *Zonaria variegata* (Lamx.) Mert. a, b transverse sections, c. $^{175}/_{1}$: a radial, b tangential; c upper surface of thallus, seen from above, c. $^{200}/_{1}$.

The thallus is about 150—200 μ thick. When examined from above the epidermal cells are seen to be arranged very regularly in rows (Fig. 14 c). The marginal rows consist of rather long rectangular cells, but these cells become soon divided by longitudinal and transverse walls into smaller cells, each row gradually getting composed of from two to four rows of small cells. These cells have rounded corners and are filled with chromatophores.

The epidermal layer on the lower side of the thallus is also composed of long rows of cells, but here the cells mostly remain undivided or they become divided now and then by a longitudinal wall into two cells, and many of the cells are not divided at all. The rows of rectangular cells, longer than broad, are upon the whole much more distinct here than on the upper side.

Fig. 14 a shows a radial transverse section of the thallus. The large cells in the centre are about 60 μ high and 80 μ broad. On the upper side 3—4 or even more flat cells are cut of. The uppermost of these cells are divided into smaller cells, forming the epidermal layer. From the lower side of the large cells also 3—4 cells are cut off; the lowermost, especially the epidermal ones, are again divided into smaller cells though fewer than in the epidermal layer above.

A tangential section of the thallus (Fig. 14 b) shows that the width of the cells in each layer is only about half of that found in the radial section, and the vertical walls are seen to be more or less distinctly undulated.

From the epidermal cells below numerous rhizoids grow out having the same moniliform appearance as those in the West Indian plant, and terminated by a coralliform disc. Scattered hairs occur in small groups on the upper side.

The specimens are sterile.

Ralfsia ceylanica Harv., described and figured by Mrs. GEPP[1], was later regarded by Mrs. and Mr. GEPP[2] as a creeping form of *Zonaria variegata*. After having seen the rather thick form from Easter Island, I feel inclined to adopt this view. In an earlier paper[3] I referred it to *Aglaozonia canariensis* Sauvag., which is, in several respects, very similar.

Area of distribution: Seems to occur in all warmer seas.

Z. crenata J. Ag.

J. AGARDH, Till Algernes Systematik (Lunds Univers. Årsskr., T. IX, 1872, p. 48).

A single large specimen is contained in the collection. As expressed by J. AGARDH (l. c.) this species takes an intermediar position between *Zonaria flava* and *Z. Turneriana*, a view confirmed by the Easter Island specimen.

The specimen was sterile.

Area of distribution: West Australia, Malayan Archipelago etc.

Fam. Fucaceae.

Sargassum Ag.

S. nov. spec., to be described by L. G. SJÖSTEDT in a separate paper. Very common, forming extensive associations in the lower litoral region.

Area of distribution: Endemic.

[1] BARTON, E. S., List of Marine Algae collected at the Maldive and Laccadive Islands by I. S. Gardiner (Journ. Linn. Soc., Bot., vol. 35).

[2] Marine Algae and Marine Phanerogams of the »Sealark» Expedition (Transactions of the Linnean Soc. of London, 2. Ser., Zool, vol. XII, part 4, 1909).

[3] BÖRGESEN, F., Two crustaceous brown algae from the Danish West-Indies (Nuova Notarisia, Serie 23, 1912).

Rhodophyceae.

Fam. Bangiaceae.

Goniotrichum Kütz.

G. elegans (Chauv.) Le Jolis.

Le Jolis, Alg. mar. Cherb., p. 103. Rosenvinge, L. Kolderup, The marine of Algae of Denmark, Part I, 1909, p. 75, where literature, synonyms etc. are also quoted.

Of this species some smaller specimens are found growing epiphytic upon *Herposiphonia tenella.*

The specimens seem to agree very well with the description and figures of Rosenvinge. In a few of the filaments several rows of cells occurred quite in accordance with the figures D. and E. of this author.

Area of distribution: Europe, Mediterranean Sea, Maroc, West Indies, Peru, Easter Island.

Erythrotrichia Areschoug.

E. carnea (Dillw.) J. Ag.

J. Agardh, Till Algernes Systematik, VI, Ulvaceae (Lunds Univ. Årsskrift, vol. XIX, 1883, p. 15). Rosenvinge, Mar. Algae of Denmark, part 1, 1909, p. 67. — *Conferva carnea* Dillwyn, Brit. Conf., 1809, pl. 84. *Conferva ceramicola* Lyngb., Hydrophytol., 1819, p. 144, pl. 48 D. *Bangia ceramicola* Chauvin, Recherch. sur l'org. de plus. genr. d'Algues, Caen 1842, p. 29—30; Harvey, Phycol. Brit., pl. 317. *Erythrotrichia ceramicola* Aresch., Phyc. Scand., 1850, p. 210; Le Jolis, Alg. mar. Cherb., 1880, p. 103, pl. 3, figs. 1—2; Berthold, G., Die Bangiaceen des Golfes von Neapel, 1882, p. 25.

Some small specimens are found epiphytic on *Jania tenella* and *Callithamnion paschale.* The plants seem to be in good accordance with the description of Rosenvinge, l. c. The filaments are about 24 μ thick. Their base was quite like the figure of Rosenvinge (l. c. fig. 8). The cells were mostly rather short, rarely longer than wide.

The spore-formation takes place in the well-known manner by means of an oblique wall at the upper end of the cells.

Area of distribution: Atlantic coast of Europe and North America, Mediterranean Sea, Maroc, West Indies, West coast of North America etc.

Erythrocladia Rosenv.

E. subintegra Rosenv.

Rosenvinge, L. Kolderup, The marine Algae of Denmark, Part I, 1909, p. 73.

Specimens quite like Rosenvinge's figure of older plants and young ones like those I have figured (Marine Algae of D. W. I., vol. II, p. 7—9, fig. 3 a, b) were found on *Cladophora* spec., mentioned above, p. 249.

Area of distribution: Denmark, West Indies, etc. Most probably widely spread.

E. vagans nov. spec. — Fig. 15.

Thallus divaricatus in superficie corticis hospitis (*Cruoriella* spec.) vage circumrepens, e filamentis irregulariter ramosis compositus.

Ramificatio aut alterna aut secunda, longa parte filamentorum nuda.

Cellulis aut cylindricis, ca. 4—5 latis et 30 μ vel ultra longis, aut magis irregulariter formatis, curvatis sinuosis, raro furcatis.

Chromatophora parietalia lobata.

Sporangia fere rotundata, ca. 4 μ lata.

The plant (Fig. 15) described here was found on a sterile crust of a *Cruoriella*. It creeps divaricately in the thick epidermal walls of the host forming, when systems of branches from different plants meet, a more or less dense network above the cells of the host.

The filaments are irregularly ramified sending out a side branch now and then at both sides (Fig. 15 c). The branches are sometimes alternate, sometimes more secund; often a branch is borne by every cell in the filament, often, too, long series of cells are destitute of branches. The filaments have apical growth; when the apical cell has reached some length it is divided by a transverse wall into two cells.

The cells sometimes are quite or almost cylindrical, about 4—5 μ broad and often more than 30 μ long, but oftener very irregular in shape, curved, sinuated, even subfurcate. In the cells a well developed parietal, lobed chromatophore is present, now and then leaving a space free; no pyrenoids were observed with certainty.

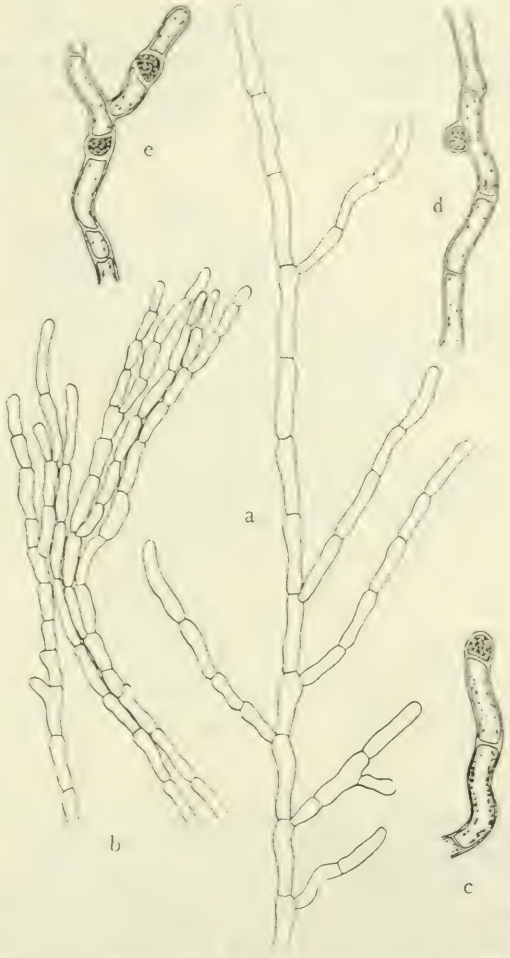

Fig. 15. *Erythrocladia vagans* nov. spec. a and b parts of the thallus, c. $^{220}/_{1}$; c, d and e parts of filaments with sporangia, c. $^{460}/_{1}$.

The sporangia (Fig. 15 c, d, e) are cut off from the vegetative cells by means of an oblique curved wall, in accordance with the description of ROSENVINGE. As the figure shows, the formation of the sporangia takes place both in the apical cell and in the intercalary cells; in one case the outgrowth of a sinuated cell had become transformed into a sporangium (Fig. 15 d). The spores are roundish, or somewhat flattened on one side and measure about 4 μ.

in diameter; the colour is denser and more deeply red than in the sterile cells, and no chromatophore could be distinguished.

The dried plant has a fine rose colour.

Area of distribution: Endemic.

E. Laurenciae nov. spec. — Fig. 16.

Thallus suborbicularis, e filamentis irregulariter radiantibus et ramosis compositus, in circuitu thalli inter se liberis, in media parte plus minus connatis. Ramificatio aut alterna, aut secunda sat irregularis.

Cellulae oblongae-subcylindricae, 4—5 μ latae et 8—10—12 μ longae.

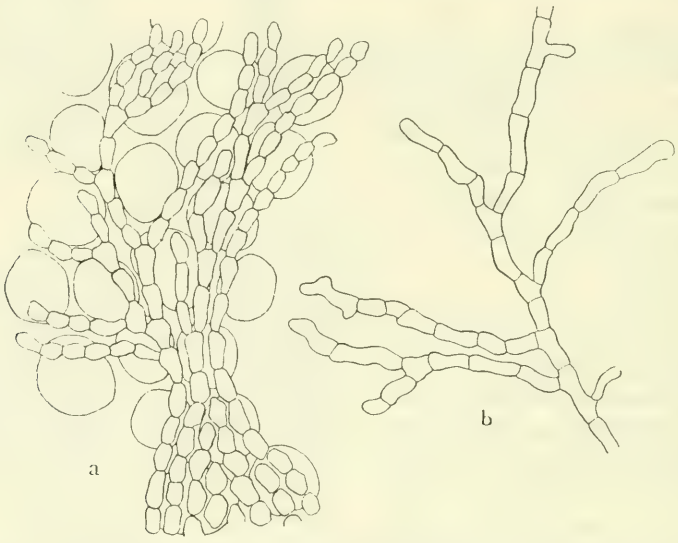

Fig. 16. *Erythrocladia Laurenciae* nov. spec. Parts of thallus; in a the tissue of the host is visible. C. $^{400}/_{1}$.

In the thick epidermal walls of *Laurencia claviformis* another representative of the genus *Erythrocladia* was found.

The plant has long ramose filaments with apical growth and these filaments radiate from the centre in all directions covering a more or less extensive area, probably as much as 1 mm across.

The ramification is rather irregular, lateral or alternate. In some specimens it happens that the alternate branching is so regular that the branch with its branchlets gets a pennate appearance. In the centre of the plant the filaments gradually combine to form a more or less coherent layer (Fig. 16 a).

The cells are oblong-subcylindrical, often a little curved so that the filaments get sinuated; cells 4—5 μ wide and generally 2—2 $^{1}/_{2}$ times as long. In the older parts of the thallus the cells get proportionally shorter and thicker, 8—10 μ wide and about as long or a little more. They contain an irregularly lobed parietal chromatophore with one or sometimes two pyrenoids.

In some instances a roundish cell were found cut off from mother cell by an oblique wall. Such cells having more dense and homogeneous contents

than the vegetative cells I regard them as asexual sporangia. They are about 5 μ in diameter.

E. Laurenciae comes near the preceding one but differs by its shorter and proportionally thicker cells, by its richer ramification and by the development of a coherent layer in the centre of the thallus.

Area of distribution: Endemic.

Fam. Helminthocladiaceae.

Acrochaetium Naeg.

A. *(Chantransia)* **moniliforme** Rosenv. — Fig. 17 a.

Rosenvinge, L. Kolderup, Mar. Algae of Denmark, Part I, p. 99.

The enormous distance between Easter Island and the original locality certainly aroused some doubt as to the identity; still, the few specimens observed seem to answer so well to the description and figures of Rosenvinge that it seems natural to bring them to his species.

From the basal spore, that does not differ much from other cells, several filaments arise. The cells are swollen in their middle, about 10—11 μ long and 8—9 μ wide. In one of the plants a long hair was found. The cell contents was very dense; the pyrenoids situated a little above the centre of the cells suggest a stellate chromatophore.

The plants are epiphytic on *Dictyopteris repens*.

Regarding the affinities between this species and *Acrochaetium catenulatum* Howe[1] or *A. crassipes* Börgs.[2], compare Howe's and my own remarks ll. cc.

Area of distribution: Denmark, Easter Island.

A. discoideum nov. spec. — Fig. 17 b—d.

Thallus epiphyticus, caespitosus, usque ad 300 μ altus. Pars basalis disciformis, unistratosa substrato (o: foliis *Sargassi*) firme adhaerens, e filis repentibus ramosis, initio inter se discretis, postea plus minus confluentibus constructa.

Cellulae filorum repentium irregulariter curvatae aut plus minus tumidae, lat. 3—4 μ, long. 9—12 μ, diametro triplo fere longiores.

Fila erecta, e disco basali orta, simplicia, stricta, usque ad 200—300 μ et ultra alta, superne gradatim in pseudopila transformata, e cellulis cylidricis ca. 6—8 μ latis et (in parte basali) ca. 15 μ longis composita.

Sporangia oblonge-ovata aut in disco sessilia aut pedicellata, ca. 11—13 μ longa et 6—8 μ lata.

This species was found on a leaf of a dried specimen of *Sargassum*, whose surface it nearly covers. The basal layer spreads widely over the surface of the substratum to which it is firmly attached. A single plant may reach more

[1] Howe, M. A., Mar. Algae of Peru, p. 84.

[2] Börgesen, F., Marine Algae of the D. W. I., vol. II, p. 20.

than $^1/_2$ mm in diameter, perhaps even more, but it is difficult to tell the exact size as the plants gradually get fused together.

The basal layer is composed of irregularly ramose filaments which are free at the margin, otherwise forming a monostromatic disc. The disc cells measure 3—4 μ across and 9—12 μ in length; often they are curved and bent.

From this basal layer erect long assimilating filaments and sporangia arise.

The assimilating filaments are simple, straight and composed of cells about 6—8 μ wide and 15 μ long in the lower part; upwards the cells grow longer

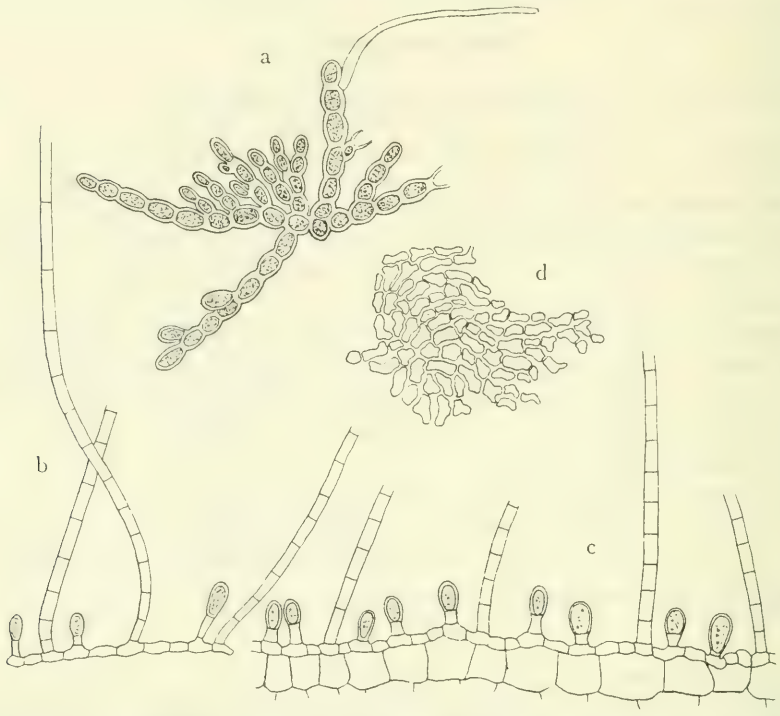

Fig. 17. **a** *Acrochaetium moniliforme* Rosenv., a single plant with sporangia (two emptied) and a hair, c. $^{400}/_1$. **b**—**d** *A. discoideum* nov. spec.: **b**, **c** sections through plants, in **c** the superficial cells of the host; **d** part of horizontal disc; all c. $^{400}/_1$.

and become almost colourless. The assimilating filaments attain a length of about 200—300 μ.

The sporangia are sometimes sessile, sometimes pedicellate. They are oblong-ovate, about 11—13 μ long and 6—8 μ across.

Regarding the cell contents this was in a bad condition, the material having been dried, but the chromatophore seems to be parietal with a parietal pyrenoid.

This species must be compared with *Chantransia leptonema* and *Ch. reducta* of ROSENVINGE, both exhibiting about the same mode of growth but differing materially in other respects from *A. discoideum*.

Area of distribution: Endemic.

A. Ralfsiae nov. spec. — Fig. 18, 19.

Thallus caespitulosus, $^1/_2$—1 mm altus, e filis endophyticis robustioribus moniliformibus et filis erectis liberis tenuioribus compositus.

Fila endophytica inter assimilatores hospitis *(Ralfsiae expansae)* immersa, ramosa, plus minus aggregata, e cellulis subglobosis-ovalibus, long. 20—22 μ, lat. 16—20 μ composita.

Fila libera erecta versus apicem gradatim attenuata, e cellulis cylindricis, 7 μ latis et 18—20—27 μ longis composita, statim a basi sparse et irregulariter ramosa. Rami aut longiores pluricellulares, aut unicellulares sporangiferi.

Sporangia oblonge-lanceolata, 9—12 μ lata et 17—20 μ longa.

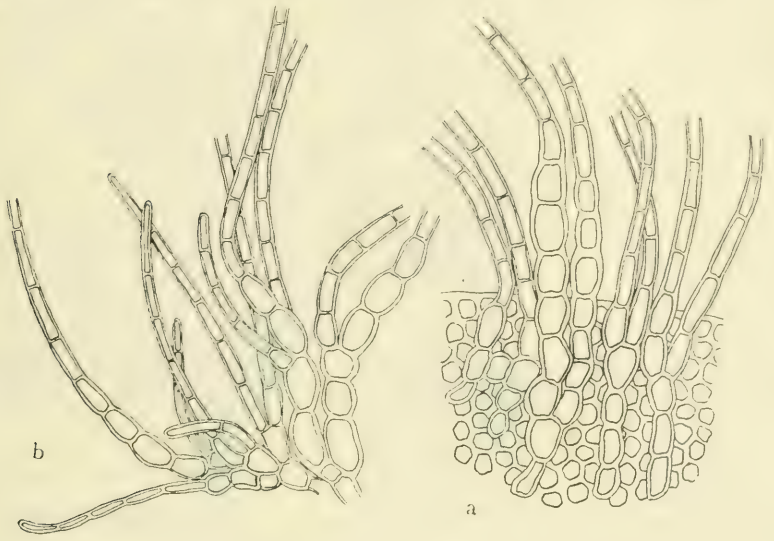

Fig. 18. *Acrochaetium Ralfsiae* nov. spec. Basal parts, in **a** immersed into the tissue of the host. C. $^{300}/_1$.

On a dried specimen of *Ralfsia expansa* this *Acrochaetium* was growing in great numbers, having a vigorously developed basal part of the thallus imbedded in the tissue of the host plant.

This endophytic basal part (Fig. 18 a and 19 a) consists of large cells mostly as long as broad or a little longer; their diameter is 20 μ; they are often swollen in the middle, the endophytic filaments thereby getting a moniliform appearance. The cell wall is very thick. The filaments are as a rule vertically arranged, the branches growing out at acute angles and more or less parallel with each other, but often also somewhat bent, finally forming a bundle in the tissue of the host. Arrived at the surface or a little above the filaments quickly decrease in size at the same time generally developing a few side branches.

The filaments in the free part of the plant are about 7 μ thick and the cells 20—27 μ long. The filaments now and then carry a side-branch, but as a rule they are not much branched. The branches are sometimes seriate but mostly without any order. Some of the branches may grow out to long filaments

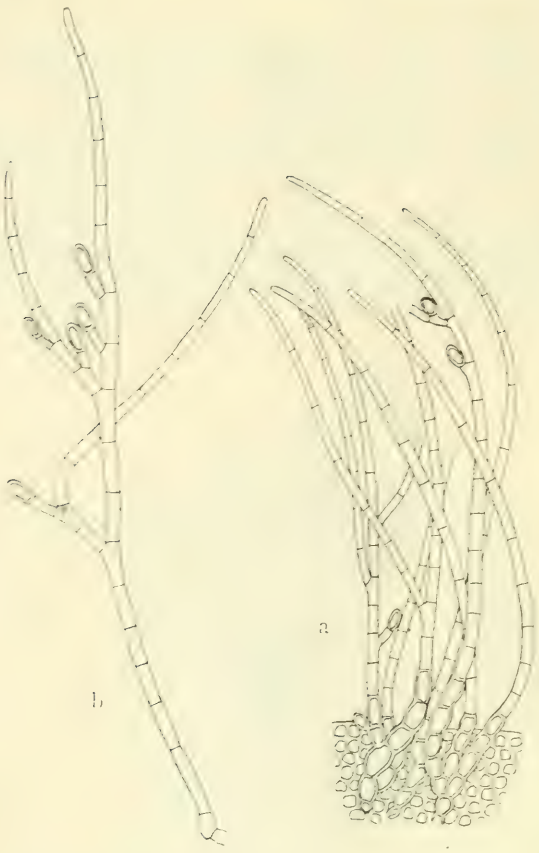

Fig. 19. *Acrochaetium Ralfsiae* nov. spec. a plants with sporangia, c. $^{250}/_{1}$; b a branch, c. $^{300}/_{1}$.

like the mother filament, but most of them remain short consisting of a single cell with a terminal sporangium.

The sporangia are oblong-lanceolate, 9—12 μ thick and 17—20 μ long.

The filaments taper a little toward their summit; most of them end in a broadly rounded cell, but some are narrowed into a pseudo-hair-like cell, which is 40—50 μ long or even longer and only 1 μ thick near the tip.

The length of the whole plant is about $^{1}/_{2}$—1 mm.

The cells contain a well developed parietal chromatophore with a large parietal pyrenoid.

By its more or less densely clustered endophytic filaments the West Indian *Acr. phaeelorhizum* reminds somewhat of this species, but in all other respects it differs widely.

Area of distribution: Endemic.

Fam. Chaetangiaceae.

Galaxaura J. Ag.

Sectio I. **Rhodura** Kjellm.

G. collabens J. Ag. — Fig. 20.

J. Agardh, Till Algernes Systematik, VII, p. 74. Kjellman, F. R., Om Floridé-Slägtet Galaxaura, p. 46.

Some rather large specimens (Fig. 20 a), 6—7 cm high, densely covered with short assimilating filaments are referable to this species as being in good accordance with the description of Kjellman.

The assimilating filaments are evenly distributed over the surface of the thallus. The plant is irregularly subdichotomously ramified, the joints being of rather variable length, 1—1 $^{1}/_{2}$ cm long or more, sometimes as much as 3 cm long acc. to Kjellman. The thallus is terete, often a little thickened toward the apex, the uppermost joints becoming slightly clavate.

The plant is richly incrusted with lime; in the dried specimens the branch ends collapse.

The colour of the dried plant is a dark red-brown.

The short assimilating filaments usually consist of 3 cells, but 4 cells are not uncommon: compare Fig. 20 b, a character to which KJELLMAN attaches much importance. The basal cells in the filaments are spherical, about 50 μ across, or a little longer than broad; the following cells gradually decrease to about 20 μ.

In the long assimilating filaments the basal cells have nearly the same size as those in the short filaments; in the cylindrical part the cells are about 16 μ thick and $1\,^1/_2$—2 times as long, and slightly constricted at the cross walls.

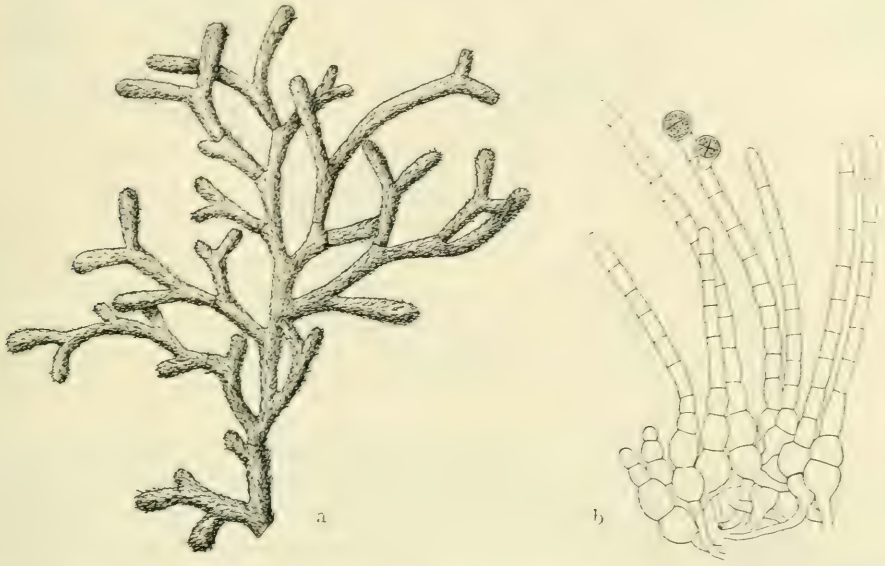

Fig. 20. *Galaxaura collabens* J. Ag. **a** part of specimen, c. $^2/_1$; **b** assimilating filaments with tetrasporangia, c. $^{135}/_1$.

The plant is tetrasporic. The tetrasporangia (Fig. 20 b) are mostly terminal on the long assimilating filaments; but now and then lateral occur, developed from the subterminal cells. The tetrasporangium is nearly spherical in shape, its diameter being 32 μ.

Most likely this plant is the tetrasporic form of the following one.

Area of distribution: West Australia, Easter Island.

Sectio II. **Microthoë** Dcne, J. Ag.

G. spec. — Fig. 21, 22.

A rather large form, about 10 cm high, forming a rounded, but rather open bush.

From the broad basal disc a great number of branches arise. They are irregularly subdichotomously divided with joints of very variable length. The

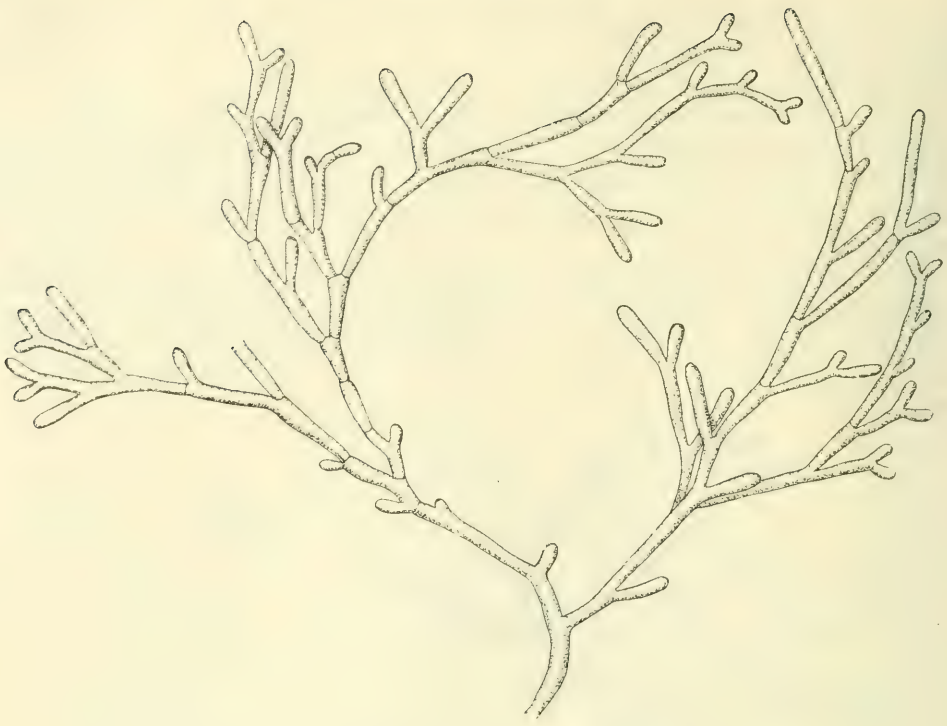

Fig. 21. *Galaxaura* spec., part of specimen, c. 1.5/1.

plant is strongly incrusted with lime. The thallus is terete and the surface is in parts nearly glabrous, but mostly covered by short stiff reddish assimilating filaments scattered evenly and densely over the surface, no annulation being visible.

The colour of the dried plant is when denudate a greyish-green while the parts covered with assimilating filaments have a sordid red-brown tinge. In the spirit material the whole thallus is, as said above, terete while in the dried material the youngest parts collapse.

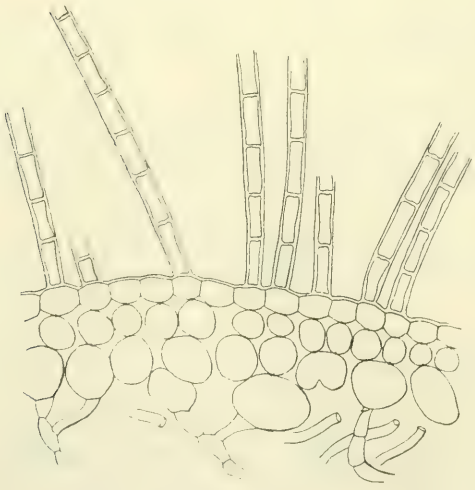

Fig. 22. *Galaxaura* spec. (same as in fig. 21). Cross section of thallus showing short assimilating filaments, c. 200/1.

The transverse section shows that the medullary tissue consists of thick-walled filaments more or less subdichotomously branched and woven together. Their diameter varies round 12 μ, but thinner and thicker ones are present.

Innermost the peripheric tissue (Fig. 22) is composed of large roundish or irregularly lobed cells, carrying quite short, often dichotomously branched filaments of 2—3 cells. The lower cells of these branches are larger and about

spherical, while the peripheric ones are short, more or less triangular in transverse section, seen from above 5—7-angled and densely united. Now and then short assimilating filaments grow out from the peripheral cells. These filaments reach a length of about 250 μ; they are composed of 7—10—15 cells, 25—30 μ long and about 16—18 μ thick.

In one of the dried specimens cystocarps were present, what agrees with HOWE's statement that all forms belonging to the group *Microthoë* are either antheridial or cystocarpic, while the corresponding tetrasporic plant is to be found in the group *Rhodura*.

Therefore it is highly probable that this plant is nothing else than the sexual form of the preceding species.

Sectio III. **Brachycladia** Sonder.

G. paschalis nov. spec. — Fig. 23—25.

Galaxaura frutescens, 5—6 cm alta e ramis erectis, teretibusque a disco basali ortis composita. Rami in parte basali subnudi dein filis assimilatoribus longis distincte in verticillas ca. 5 mm latas dispositis instructi, superne subglabri, subdichotome ramosi, articulati, articulis longitudine variabili 5—8 mm longis.

In parte basali ramorum axis centralis e filamentis irregulariter ramosis et inter se contextis composita exstat; tela peripherica e filis aut longis aut brevibus constructa; fila longa cylindrica e cellulis 24 μ crassis et 80 μ longis composita, fila brevia e 3—6 cellulis basalibus majoribus oblongis versus apicem minoribus et subsphaericis constructa; in superiori parte ramorum tela peripherica e cellulis oblongo-subcylindricis formata est.

This plant belongs to the group *Brachycladia* of KJELLMAN. Fig. 23 represents part of the thallus.

The erect shoots arise from a broad basal disc and reach a heigth of about 5—6 cm. Just as in the other species of this group, the lower and upper parts of the thallus are different as regards both outer appearance and anatomical structure.

The lower stemlike portion is $1^1/_2$—2 cm high in our species; it is ornated with long hairs nicely arranged in discriminate whorls;

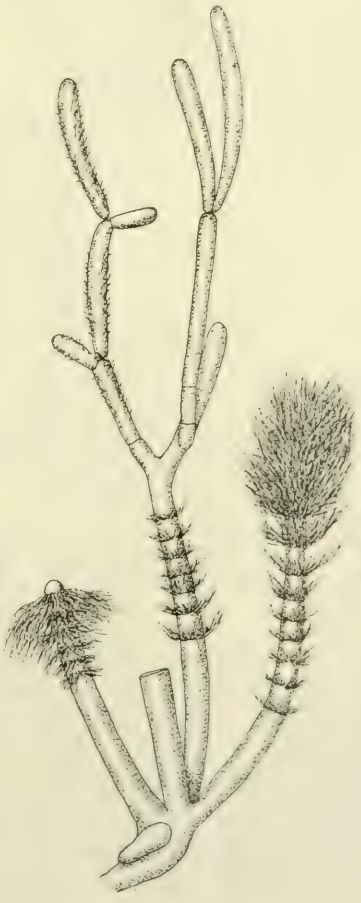

Fig. 23. *Galaxaura paschalis* nov. spec., part of specimen, c. $^2/_1$.

the upper, well developed whorls are often more than 5 mm broad; downwards the hairs gradually die away and fall off.

This basal part, always unbranched it appears, bears the glabrous repeatedly subdichotomous upper part of the thallus. It is terete and jointed, with joints of varying length, from 5 to 8 mm. At the summit and also at the ends of the joints now and then a more or less well developed whorl of hairs is present.

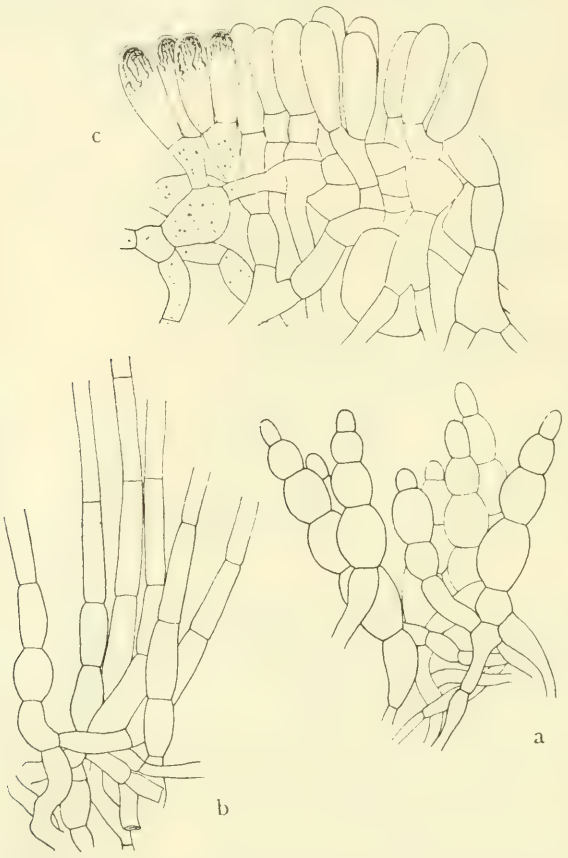

Fig. 24. *Galaxaura paschalis* nov. spec. **a**—**b** fragments of thallus with short (**a**, c. $^{135}/_{1}$) and long (**b**, c. $^{135}/_{1}$) assimilating filaments; **c** cross section in the upper part of a branch, c. $^{250}/_{1}$.

The anatomy of the basal part (Fig. 24 a, b) reminds very much of what we find in the group *Rhodura*. The whorls consist of long assimilating filaments with shorter ones intermingled. The short assimilating filaments (Figs. 24 a, 25) are composed of 3—4 or more roundish oval cells; the uppermost are smallest, almost spherical or a little longer than broad, about 20—25 μ thick, the lowermost oblong and much larger, up to 60 μ thick. The long assimilating filaments (Fig. 24 b) have basal cells of nearly the same shape as those found in the short ones; the cylindrical part consists of cells about 24 μ thick and 80 μ long. They have rather thick walls and are only very little narrowed at the cross walls.

The stem portions between the hair whorls consist of short assimilating filaments only. In the uppermost glabrous part of the thallus the structure of the peripheric tissue is quite different (Fig. 24 c). It is composed of oblong-subcylindrical cells, about 60 μ long and 24 μ broad and closely packed together. The tissue in the interior of the whole thallus is composed of long irregularly bent subdichotomous filaments woven together.

Of species with terete thallus only one, *G. lenta*, is listed by KJELLMAN in his work of *Galaxaura*. The present species is quite different. With regard to the basal part our plant looks rather like *G. arborea* Kjellm., but in other respects this species differs greatly from the present one.

Area of distribution: Endemic.

Fig. 25. *Galaxaura paschalis* nov. spec. Short and long assimilating filaments, c. $^{175}/_{1}$.

Fam. Gelidiaceae.

Gelidium Lamour.

G. pusillum (Stackh.) Le Jolis. — Fig. 26.

LE JOLIS, Liste, p. 139. — *Gelidium repens* Okamura in Bot. Mag., vol. 13, 1899, p. 7, pl. II, figs. 5—8.

This small plant, well known from the coast of Europe, has been found by OKAMURA at the coasts of Japan and Australia and was at first regarded by him as a new species. But in a later paper: List of marine Algae collected in Caroline Islands and Australia (Bot. Mag., vol. 18, 1904, p. 86–87) OKAMURA rightly referred his species to *G. pusillum*.

Quite as is the case with the plant of OKAMURA the plant from the Easter

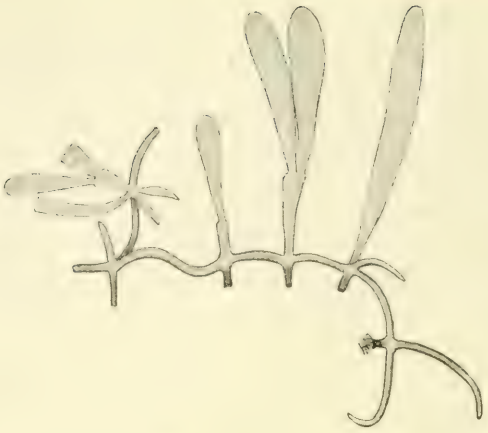

Fig. 26. *Gelidium pusillum* (Stackh.) Le Jol. Part of a plant; most of the rhizoids are broken, c. $^{12}/_{1}$.

Island is most like the form called *Acrocarpus pusillus* by KÜTZING in his »Tabulæ», vol. 18, pl. 37, and not *Acrocarpus pulvinatus*. The Easter Island specimen grew on a small shell and was two—three mm high. The creeping rhizome-like part of the thallus was terete and about 11 μ thick. Is was firmly attached to the substratum by means of vigorous rhizoids deeply sunk into the shell. Opposite the rhizoids, from the upper side of the rhizome, erect leaf-like shoots grow out, at first single, later often more or less cespitose.

Tetrasporangia are formed in the tips of the leaf-like branches.

The Easter Island plant certainly comes very near var. *conchicola* Piccone and Grunow, Algol. Eritrea (N. Giorn. Bot. Ital., vol. 16, 1884, p. 316); comp. OKAMURA, List of Mar. Algae collected in the Caroline and Marianne Islands (Bot. Mag., vol. 30, 1916, p. 9, fig. 6). It also resembles var. *minuscula* Weber van Bosse, Alg. Siboga, p. 226.

Area of distribution: Atlantic and Mediterranean coast of Europe, Maroc, Japan, Australia, Easter Island.

Caulacanthus Kütz.

C. spinellus (Hook. f. et Harv.) Kütz. — Figs. 27, 28.

KÜTZING, Species Alg., p. 753. — *Rhodomela*? *spinella* Hook. f. et Harv.; HOOKER, J. D. and W. H. HARVEY, Algae Novae Zelandiae (The London Journal of Botany, vol. IV, 1845, p. 534).

A few sterile fragments of an irregularly ramified filamentous alga belong I think to this species. The branches, arranged without any order at all are sometimes short, spine-like, sometimes prolonged.

The thallus grows by means of an oblique top cell from which a tissue is formed consisting of a central row of cylindrical cells, encircled by some smaller ones which again gradually pass into a cortical layer of small cells. On a longitudinal section the cells of the central tube measure about 25—40 μ across and 100—150 μ in length, according to the strength of the axis. These large cells contain bundles of raphides. The cells next to these are also rather long about twice their own width; the following are shorter and shorter, as we proceed toward the surface.

The thallus is from 150 μ—200 μ thick. It is fixed to the substratum by means of small discs growing out everywhere from the surface of the thallus and composed of a bundle of rhizoids. By means of such discs also branches of the same individual get united. In this respect it quite agrees with *Wurde-*

Fig. 27. *Caulacanthus spinellus* (Hook. f. et Harv.) Kütz. Part of specimen, c. $^{17}/_{1}$.

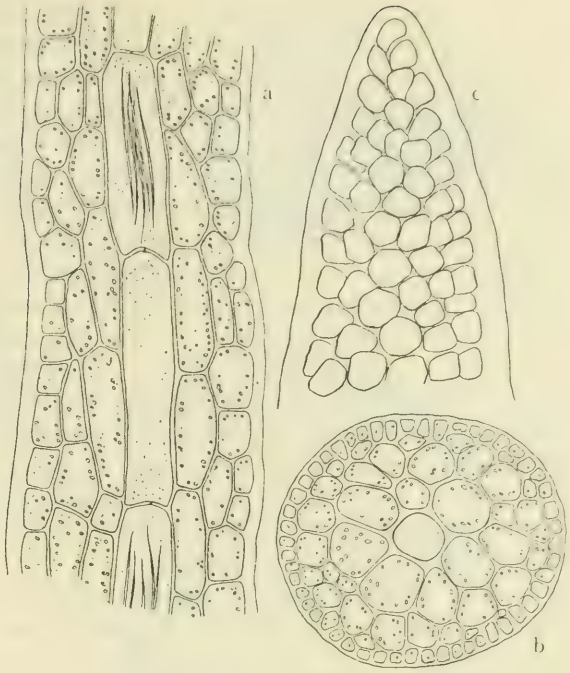

Fig. 28. *Caulacanthus spinellus* (Hook. f. et Harv.) Kütz. **a** longitudinal (c. $^{250}/_{1}$) and **b** transverse section of thallus (c. $^{170}/_{1}$); **c** apex, c. $^{450}/_{1}$.

mannia setacea to which it bears a considerable external resemblance; the anatomy is, however, essentially different.[1]

Caulacanthus indicus Weber v. Bosse is a much larger plant, the thallus being 1—2 mm broad; in its outer habit it seems quite to agree with the present plant, having the same antler-like ramification and the same discs by means of which it attaches itself to other algae etc.

Area of distribution: New Zealand, Easter Island.

Fam. Rhizophyllidaceae.

Rhizophyllis Kütz.

Rh. pacifica nov. spec. — Fig. 29—31.

Thallus crustæformis, membranaceo-corneus, margine irregulariter lobato, lobis anastomosantibus, rhizoideis perlongis numerosis ex parte thalli deorsum vergente natis adfixus.

Thallus dorsiventralis, e stratis duobus compositus, stratum superius corticale e cellulis 2—3 minoribus constat in filamenta ordinatis; inter ea glandulae majores sparsae sunt.

[1] Compare my figures in Mar. Alg. D. W. I., vol. II, p. 369.

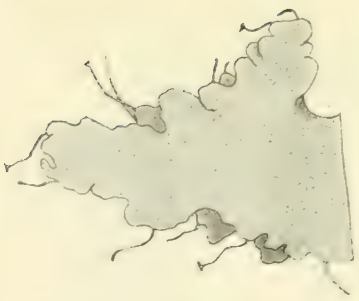

Fig. 29. *Rhizophyllis pacifica* nov. spec., part of plant, c. $^{17}/_{1}$.

Stratum inferius crassius parenchymaticum e cellulis rotundatis majoribus et minoribus inter se mixtis formatum est; hic illic cellulae majores in series ordinatae occurrunt.

Tetrasporangia in nemathecia explanata e cellulis corticalibus orta, irregulariter zonatim divisa.

On a piece of a *Lithothamnion* a small fragment (scarcely more than $^{1}/_{2}$ square cm) of a crustaceous alga was found, which I refer with some hesitation to the genus *Rhizophyllis*.

It forms an irregularly lobed crust about 250 μ thick, the lobes overlapping each other. The surface is uneven, somewhat crispate (Fig. 29). It is easily detached from the substratum, to which it is fastened by means of numerous rhizoids; these rhizoids grow out everywhere, not only from the lower surface, but also from the margin.

The concistency of the thallus is fleshy-cartilaginous. No incrustation of lime is found.

Fig. 29 shows a piece of the thallus with the margin; the numerous small lobes more or less overlapping each other and at last fused together are clearly shown.

The thallus has a distinct dorsiventral structure (Fig. 30, 31). It seems to increase in size by marginal divisions, performed by all the cells of the margin (Fig. 31 d); in any case no distinct top-cell was observed in the material at hand. Fig. 31 d illustrates the margin. It is seen that the cells near the margin are mostly arranged in rows; sometimes these rows are nearly parallel, sometimes diverging. The cells are smallest at the periphery. Generally they are cut off by cross walls parallel to the periphery, but sometimes, too, by oblique walls. All the cells are rather uniformly developed and have tick walls, giving the impression that the growth has ceased for the present.

A transverse section of the thallus (Fig. 30) shows a cortical layer above and a thick parenchymatic tissue below. The latter consists of roundish cells of very different size, up to c. 40 μ or more in diameter; the cells are largest in the middle, smaller upwards and downwards, they have thick walls and contain much starch, especially in the upper part of the tissue.

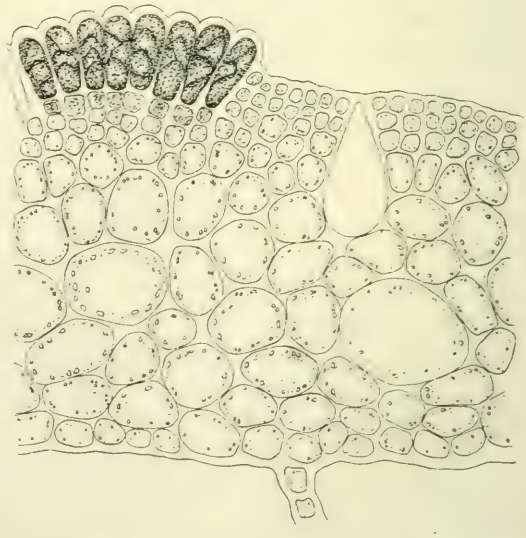

Fig. 30. *Rhizophyllis pacifica* nov. spec. Cross section with a tetrasporangium sorus and a gland-cell. C. $^{250}/_{1}$.

In the parenchymatic tissue in the central part of the thallus

long rows of large cells are present (Fig. 31 a); they are bent here and there and their occurrence seems upon the whole to be rather accidental, parts of the thallus being quite destitute of such cell-rows. They are formed by large, subcylindrical to barrelshaped, thick-walled cells, about 100 μ long and 65 μ across. In the scarce material I have not been able to follow them to the margin or to explain how they are formed. In the description of *Rhizophyllis* in ENGLER & PRANTL, Natürl. Pflanzenfam., I. Teil, VI. Abt., p. 531, the mid-rib is described as follows: »der Bauchseite genähert verläuft in der Thallusmitte eine gegliederte Centralachse, 2-zeilig alternierend in die Zähne und Lappen des Thallusrandes hinein verzweigt». If we compare this description with that

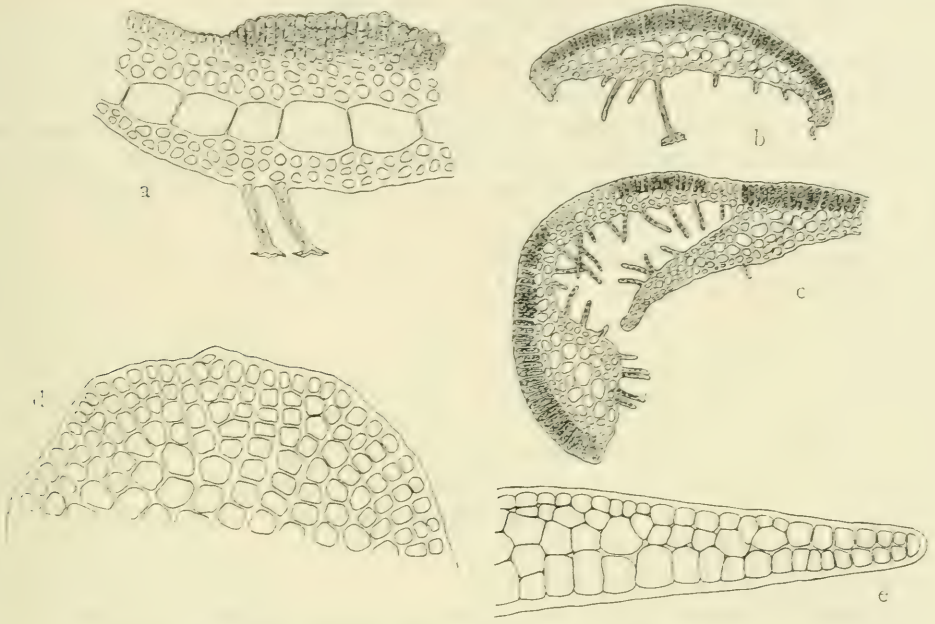

Fig. 31. *Rhizophyllis pacifica* nov. spec. a—c transverse sections of thallus; d marginal portion e cross section of margin. a c. $^{80}/_{1}$, b, c $^{60}/_{1}$, d $^{185}/_{1}$, e $^{270}/_{1}$.

given above, there is a considerable difference, as I have not observed any branches from the tube of the long cells, nor is it arranged in such a way that it can be called a »Centralachse».

The parenchymatic tissue gradually passes into the cortical layer above. The latter is composed of small rounded cells arranged close together in short rows of 2—3 cells which become smaller toward the surface. Seen from above they form a very dense epidermal layer composed of quite small cells, only 4—5 μ in diameter and with very thick walls. The epidermal cells of the lower surface are larger, polygonal and c. 40—50 μ across.

Scattered in the cortical layer we finally come across the large characteristic gland-cells (Fig. 30). They are oval-pyriform, often even somewhat lageniform, c. 35 μ wide and 75 μ long, with their broadly rounded base sunk deep down into the parenchymatic tissue, penetrating with their attenuated summit between the cortical cells to just below the upper surface of thallus, leaving a small

porus open above their mouth-like upper end. When the thallus is seen from above the gland cells are easily observable as clear bodies between the dark cortical cells. They are uniformly scattered over the thallus, and contain a clear mucilage.

The tetrasporangia (Figs. 30, 31) are formed in large sori on the surface of the thallus. The sporangia are elongate-ovoid, often slightly tapering toward the base, and transversly divided by oblique, often somewhat curved walls into four spores. The sporangia measure c. 40 × 17 μ.

As the plant was preserved in alcohol, nothing is known about the colour in a fresh stete.

Neither cystocarps nor antheridia were found.

According to the descriptions of SCHMITZ, HAUCK and DE TONI and to my observations on dried material, *Rh. Squamariae* bears considerable resemblance to the new species in its anatomical structure. On the other hand, characters like the irregular crust-shaped thallus, the (presumably) marginal growth etc. remove *Rh. pacifica* from the Mediterranean species. The generic position of the former remains uncertain as long as we have not seen a more complete material, including sexual plants.

Area of distribution: Endemic.

Fam. Squamariaceae.

By Mme. Dr. A. WEBER VAN BOSSE.

Cruoriopsis Duf.

C. de Zwaanii Web. v. B.

WEBER VAN BOSSE, Liste des Algues du Siboga, Rhodophyceae, prem. partie 1921, p. 267.

In all essential points the alga of Easter Island resembles *Cr. de Zwaanii,* but I have seen only tetrasporic plants. It may be that plants bearing cystocarps are different from *Cr. de Zwaanii.*

Area of distribution: Island Nias, west coast of Sumatra, Easter Island.

Ethelia W. v. B.

E. pacifica nov. spec.

Thallo substrato affixo, ± 300 μ crasso, constante e mesothallo et perithallo superiore et inferiore. Mesothallo constante e filamentis ramosis, flabelliformibus. Perithallo superiore constante e filamentis obliquis in parte basali, terminatis in partem superiorem satis latam erectam. Perithallo inferiore solum filamentis obliquis munito, quorum pluria exeunt in rhizoidea.

Cellulis perithalli superioris ± 3—6 μ latis et 8—9 μ altis, cellulis perithalli inferioris 5—9 μ latis et 18 μ altis. Organis fructificationis non visis.

Thallus adhering firmly to the substratum ± 300 μ thick, consisting of a mesothallus and a perithallus superior and inferior. Mesothallus consisting of flabella-like branched filaments. Perithallus superior consisting of oblique filaments in the basal part, ending in a pretty broad straight upper part.

Perithallus inferior having only oblique filaments, many of these running out in rhizoids.

Cells of perithallus superior ± 3—6 μ broad and 8—9 μ high. Cells of perithallus inferior 5—9 μ broad and 18 μ high.

Organs of fructification not observed.

As long as the organs of fructification are unknown it will remain doubtful whether an alga, with a midlayer of cells giving off ascending and descending filaments, is a representative of the genus *Ethelia* (the type of which is *E. Fosliei*) or a representative of the genera *Cruoriella* or *Peyssonnelia* and differing from the types of these genera no more than *Ralfsia deusta* differs from *Ralfsia clavata*.[1] *Ethelia Fosliei* has a mesothallus with an extremely well defined perithallus superior and inferior and nemathecia with paraphyses that have top-cells adhering together and covering almost the tetrasporangium in a young state. The new alga from Easter Island does not give any light on this matter as none of my many slides showed signs of fructification. Its anatomical structure mostly resembles *Ethelia (Peyssonnelia) biradiata* from the Indian Ocean. It differs from this alga by its mode of growth, for *E. pacifica* adheres firmly to the substratum whereas *E. biradiata* may be very easily detached and seems even here and there to lie loose on the substratum while growing. The thallus of *E. pacifica* adheres so firmly that I found it impossible to make a good slide through the thallus, unless I cut the substratum at the same time. The decalcifying of the substratum, consisting mostly of worm tubes, required much time as the tubes were of different consistence. The use of various acids had also a destructive influence on the contents of the cells and propitiated the swelling of the membranes, circumstances that were unfavourable to the making of good slides.

Another difference between the two algae lies in the size of the filaments. The ascending filaments of *E. biradiata* are ± 8 μ broad and are 2—3 times as high as broad. Those of *E. pacifica* are broad 3—6 μ and 8—9 μ high. The filaments of the perithallus inferior are in both algae longer and broader than the ascending filaments. The colour was gone in the specimens of *E. pacifica* that I had for examination. *E. biradiata* has a bright red colour.

Area of distribution: Endemic.

Fam. Corallinaceae.

Melobesieae, par Mme PAUL LEMOINE.

M. SKOTTSBERG a recueilli quelques espèces intéressantes dans cette île isolée d'où jusqu'ici non ne connaissait que deux espèces: *Porolithon onkodes* (Heyd.) Fosl. et *Porolithon praetextatum* Fosl.; il a d'ailleurs retrouvé la première de ces deux espèces, associée à d'autres espèces pacifiques littorales.

[1] conf. REINKE, Algenflora der Westl. Ostsee deutschen Anteils, 1889, p. 48.

Lithothamnion (Phil.) Fosl.

L. siamense Fosl. — Fig. 32 a.

M. Foslie in Flora of Koh Chang (Bot. Tidsskr. XXIV, 1901, p. 19 (non f. *simulans*)); Id. in Weber et Foslie, The Corallinaceae of Siboga Expedition, Siboga Expeditie LXI, 1904, p. 10, fig. 3, Pl. I, fig. 1—9.

N'ayant jamais vu d'échantillon de *L. siamense* j'ai quelque hésitation à rapporter à cette espèce un échantillon de l'Ile de Pâques dont les caractères paraissent cependant coincider parfaitement avec la description de M. Foslie; cependant les figures 1, 2 qui représentent le type de l'espèce en donnent une idée confuse.

L'échantillon de l'Ile de Pâques mesure 2 à 3 cm; il est formé de lamelles extrèmement minces (50 à 70 μ d'épaisseur après décalcification) et fragiles, de taille variable, irrégulièrement superposées et imbriquées de manière à constituer un complexe de croûtes d'une épaisseur de 2 à 5 mm; ces lamelles, finement striées sur leur face inférieure, sont lisses sur leur face supérieure; la plupart sont plus ou moins horizontales, mais souvent aussi elles sont contournées ou recourbées, ou s'enroulent en forme de tiges creuses; elles donnent également naissance à de petites excroissances; enfin on remarque aussi des lamelles disposées verticalement.

Cet échantillon paraît correspondre à une variété plus résistance que ceux décrits par M. Foslie; cet auteur a en effet observé des croûtes de 30 à 60 μ d'épaisseur seulement qui, en se superposant n'atteignaient que 300 μ d'épaisseur. Pour les autres caractères sa description s'applique à l'échantillon en question, et les divergences qu'on peut relever sont de faible importance.

Chacune des feuilles qui constitue l'échantillon, de l'Ile de Pâques est constituée par l'hypothalle et le périthalle; dans les lamelles disposées horizontalement le périthalle est plus développé que l'hypothalle; l'inverse se produit dans les parties où les lamelles sont recourbées et presque libres (fig. 32 a). L'hypothalle est formé de cellules courtes de 5 à 15 μ de long et 5 à 8 μ de large; dans certaines lamelles les cellules ne dépassent pas 7 μ de longueur; les cellules hypothalliennes sont rectangulaires à angles arrondis. Le périthalle est formé de files lâches dont les cellules mesurent 3 à 9 μ × 3 à 7 μ.

Je crois avoir observé les deux sortes de conceptacles: les conceptacles à sporanges ont un toit légerement bombé, leur diamètre est de 280 à 480 μ; je n'ai vu ni les pores du toit du conceptacle, ni les spores.

Les conceptacles à cystocarpes ont un toit de forme convexe percé d'un pore au sommet; leur diamètre varie de 300 à 500 μ.

L. siamense se rapproche par sa structure et la fragilité de ses croûtes de *Lithothamnium mesomorphum* Fosl. de l'Atlantique (Bahamas, Bermudes, Antilles).

Répartition géographique: *L. siamense* a été découvert dans le Golfe de Siam, puis retrouvé ensuite en différentes régions du Pacifique: Sumbawa (Est de Java), Archipel Sulu, Ile Nusa-Laut, Ile Kei; il a été recueilli à des profondeurs variant de 5 à 69 mètres. A l'Ile de Pâques il a été recueilli dans la zone littorale à Hanga Piko.

Lithophyllum (Phil.) Fosl.

Deux des espèces de *Lithophyllum* de l'Ile de Pâques n'ont aucunement la structure typique de ce genre, telle que je l'ai caractérisée au point de vue anatomique, mais elles en possèdent les organes reproducteurs; aussi je les laisse provisoirement dans ce genre, dans lequel elles constituent une section spéciale, ainsi que quelques autres espèces déjà signalées dans différentes régions du globe.

L.(?) samoense Fosl. — Fig. 32 b.

M. FOSLIE: Algologiske notiser II, D. K. N. Vid. Selsk. Skrifter, 1906, no. 2, p. 20.

M. FOSLIE n'a jamais figuré cette espèce, qu'il avait tout d'abord réunie au *L. decipiens* Fosl. En comparaison de l'échantillon de l'Ile de Pâques, j'ai étudié un échantillon de l'Herbier BORNET, provenant de Tahiti, dont M. FOSLIE fait d'ailleurs mention loc. cit.

L. samoense montre en coupe verticale un hypothalle peu développé, formé de files horizontales dont les cellules mesurent 6 à 17 μ de longueur et 3 à 7 μ de large, quelquefois 9 μ. Le périthalle est formé de très petites cellules carrées ou rectangulaires de 3 à 5 μ, atteignant 7 et 8 μ de longueur et 3 à 7 μ de large. L'espèce forme souvent plusieurs thalles superposés. J'ai noté, pour les conceptacles les dimensions de 125 à 280, après décalcification, tandis que FOSLIE indique 100 à 200 μ; ces conceptacles convexes deviennent ensuite déprimés ainsi que le montre l'échantillon de l'Herbier BORNET. *L. samoense* a été recueilli sur un caillon, associé à *Por. onkodes* et *Lithophyllum rasile*, et il recouvre *Melobesia (Litholepis) accola;* il forme une croûte à surface granuleux avec une bordure lisérée de blanc; la limite de chacune des croûtes qui vit sur le même support est marquée par un rebord crénelé.

Répartition géographique: Tahiti (Herbier BORNET, Museum d'Histoire Naturelle de Paris); Samoa, Ile Savaii (RECHINGER ex FOSLIE).

L.(?) myriocarpum (Fosl.) — Fig. 32 c.

Lithothamnion myriocarpum Foslie, On some Lithoth. in Det K. Norske Vidensk. Selsk. Skr., Trondhjem 1897, no. 1, p. 19. *Goniolithon myriocarpum* Forslie, Siboga Expeditie 1904, p. 45, Pl. IX fig. 6, 7; Idem in Alg. Not. III, Det K. Norske Vidensk. Selsk. Skr. 1906, no. 8 (1907), p. 14 (f. *confragosa*); Idem Alg. Not. VI, Ibid. 1909 no. 2, p. 9. Non *Melobesia myriocarpa* Crouan, = *M.* (Pliostroma) *zonalis* (Crouan) Fosl.

L. myriocarpum forme des croûtes d'aspect peu caractéristique, assez fréquentes, semble-t-il dans le Pacifique.

En coupe l'hypothalle montre des cellules plus ou moins rectangulaires de 7 à 15 μ de longueur et 3 à 7 μ de largeur; le périthalle est formé de cellules de forme assez variable; les cellules d'une même file communiquent entre elles par un pore brillant, et souvent par une partie retrécie en forme de petit canal; le même caractère s'observe dans le *Lithothamnium calcareum* d'Europe.

Répartition géographique: Mer Rouge, Indes, Célèbes, Iles Chagos, Seychelles, N^lle^ Guinée, Lucipara, Dammer, Mangareva, Tahiti etc.

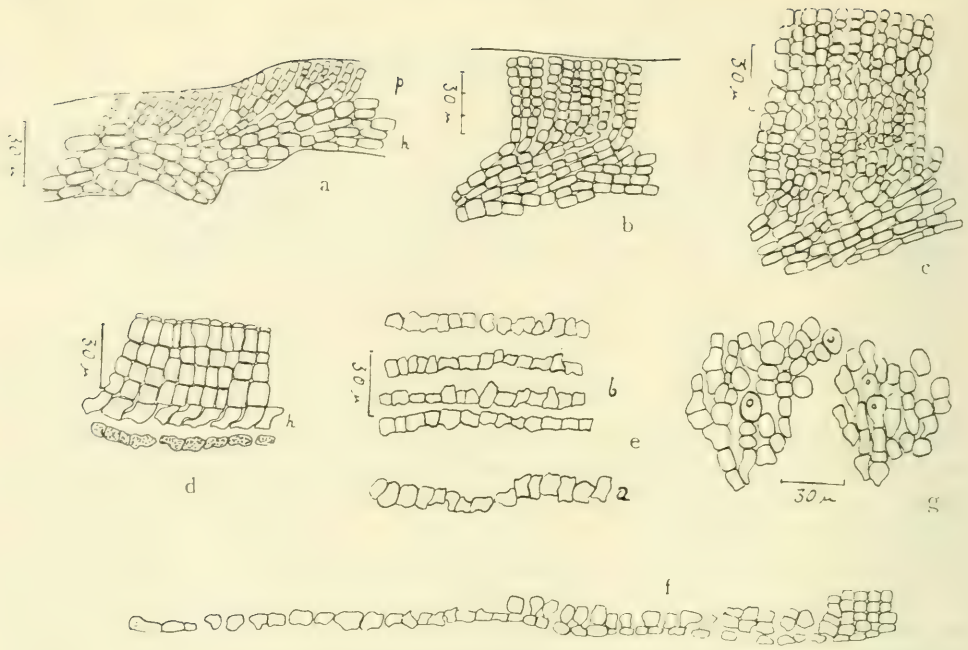

Fig. 32. **a** coupe verticale du thalle de *Lithothamnium siamense; h* hypothalle, *p* périthalle; **b** coupe du thalle de *Lithophyllum*(?) *samoense;* **c** coupe d'un fragment de croûte de *L.*(?) *myriocarpum;* **d** *Lithophyllum (Derm.) rasile* recouvrant *Melobesia (L.) accola* dont les cellules sont en grisé; **e** cellules de *Melobesia (Litholepis) accola*, *a* de Tahiti, *b* de l'Ile de Pâques; **f** coupe d'un thalle de *Melobesia paschalis;* **g** cellules de *Melobesia paschalis* vues de dessus.

L. *(Dermatolithon)* **rasile** Fosl. — Fig. 32 d.

M. Foslie: Alg. Not. III, Det K. Norske Vidensk. Selsk. Skr., Trondhjem 1906, no. 8 (1907), p. 34 et Alg. Not. VI, Ibid. 1909, no. 2, p. 57.

Cette petite espèce est représentée dans la collection de l'Ile de Pâques par un petit thalle d'un rose vif, de 10 mm × 12 mm qui recouvre *Melobesia* (Litholepis) *accola;* sa bordure, lisérée de blanc, montre quelques stries concentriques peu marquées; à la surface de *Lithophyllum*(?) *samoense* on observe également quelques très petits thalles très jeunes qui appartiennent à la même espèce.

M. Foslie indique pour cette espèce une variation assez considérable dans la longueur des cellules hypothalliennes (14 à 54 μ). En effet dans une coupe dans laquelle l'hypothalle était seulement recouvert par une rangée de cellules corticales, les cellules hypothalliennes mesuraient 20 à 60 μ; au contraire dans d'autres coupes (fig. 32 d) j'ai observé l'hypothalle *h*, formé de cellules de 15 μ environ de hauteur, mais il était surmonté de 3 à 4 rangées périthalliennes; celles-ci sont formées de cellules de 8 à 12 μ de hauteur; la dernière rangée est recouverte de cellules corticales; d'après la description de M. Foslie, les cellules périthalliennes peuvent également subir une assez grande variation de taille et pourraient atteindre 36 μ.

Répartition géographique: Océan Indien: Laquedives; Pacifique: Timor (échantillon récolté par M^me^ Weber van Bosse, nommé *L. papillosum* f.? par Foslie in Siboga Expeditie 1904, p. 63); Tahiti (leg. Seurat, Herbier du Museum de Paris).

Melobesia (Lamx.) Fosl.

M. *(Litholepis)* **accola** (Fosl.) Lem. — Fig. 32 e.

On sait que M. FOSLIE a crée *Litholepis* pour des *Melobesia* dont le thalle est formé d'une seule rangée de cellules, et dans lesquelles les thalles se superposent de telle sorte qu'en coupe on observe souvent plusieurs rangées. Dans l'échantillon de l'Ile de Pâques j'ai observé jusqu'à 5 à 6 rangées superposées, toutes semblables (fig. 32 e, b); les cellules sont soit rectangulaires, soit allongées verticalement, souvent aussi de forme assez irrégulière; cependant leur dimension ne varie que de 5 à 10 μ pour la hauteur et 5 à 12 μ pour la largeur.

M. FOSLIE avait indiqué la dimension de 14 à 30 μ pour les cellules de *M. accola;* mais j'ai étudié un échantillon de Tahiti qui fait partie de la collection du Museum d'Histoire Naturelle et qui a été déterminé par lui, et dans la coupe obtenue j'ai observé une rangée de cellules de 5 à 12 μ de hauteur et 7 à 10 μ de largeur (fig. 32 e, a); l'espèce de Tahiti est donc bien semblable à celle de l'Ile de Pâques.

L'aspect de cette petite espèce est curieux: les croûtes sont très minces et sont discontinues; elles sont pourvues de très nombreux conceptacles de 100 à 180 μ environ, percés d'un pore. Lorsqu'on observe le thalle de dessus, les cellules, rectangulaires-arrondies, mesurent 7 à 10 μ × 5 à 7 μ, disposées en files.

L'un des échantillons de l'Ile de Pâques provient de Hanga Piko, région littorale; l'autre sans indication précise partage le même support que les autres espèces étudiées, et est recouvert en certains points par *L. rasile* et *L. samoense.*

Répartition géographique: Tahiti, Hao (leg. SEURAT, Herbier du Museum d'Histoire Naturelle de Paris), Ile de Pâques.

M. paschalis nov. sp. — Fig. 32 f, g.

La seule espèce épiphyte recueillie par M. SKOTTSBERG me paraît être une espèce nouvelle; elle forme sur *Zonaria variegata* une croûte extrèmement mince, à peine calcifiée, de 3 cm environ, de couleur grise sans aucune bordure. A la loupe on remarque que les conceptacles se trouvent au centre de petits épaississements qui forment comme de minuscules croûtes secondaires qui se détachent facilement.

En coupe on constate que la partie la plus mince du thalle est formée d'une seule rangée de cellules; celles-ci ont une forme assez variable et souvent elles ne se touchent pas; leur hauteur est d'environ 5 à 9 μ, leur largeur 5 à 15 μ. Ces cellules, vues de dessus, sont encore plus irrégulières dans leur forme; et variables dans leur taille; certaines sont transformées en hétérocystes (fig. 32 g).

Si on fait une coupe dans une région fructifiée du thalle, on peut suivre le processus de l'épaississement du thalle; j'ai figuré (fig. 32 f) l'aspect de la

coupe telle que je l'ai obtenue; on remarquera l'irrégularité de forme des cellules, leur manque de cohésion; dans les parties formées de 2 rangées il y a souvent un espace entre les deux rangées qui paraissent alors indépendantes l'une de l'autre. Dans les parties les plus épaisses, j'ai observé 5 cellules superposées, toutes de taille à peu près semblable, 3 à 6 μ de hauteur; l'épaisseur maximum du thalle est de 20 à 25 μ.

Les conceptacles, de très petite taille, mesurent environ 160 μ de diamètre; l'un d'eux paraissait contenir des bispores de 30 à 39 μ × 15 à 20 μ, et une tétraspore de 50 μ × 30 μ.

Melobesia farinosa était jusqu'ici la seule espèce pourvue d'hétérocystes; mais le thalle vu de dessus est bien différent de celui de *Melobesia paschalis,* les cellules sont de forme beaucoup plus constante et elles sont alignées en files régulières, même dans la var. *Solmsiana* où le tissu est beaucoup plus lâche et lacuneux que dans le type.

Des différences fondamentales existent aussi dans la dimension des conceptacles, et la structure de l'espèce vue en coupe.

Porolithon Fosl.

P. onkodes (Heydr.) Fosl.

Voir la bibliographie dans M^me^ P. Lemoine, Annales Inst. Océanogr. Monaco, t. II, fasc. 1 (1911), p. 160.

Cette espèce forme des croûtes assez épaisses, qui ainsi qu'on le sait, jouent un rôle important dans la construction et la consolidation des récifs coralliens du Pacifique, où elle est l'une des espèces les plus abondantes.

La croûte étudiée a montré le tissu caractéristique de *P. onkodes* avec les groupes de grosses cellules disséminées au milieu du tissu; mais celles-ci sont de taille plus faible que la normale: 12 à 18 μ au lieu de 16 à 25 μ; peut-être d'autres coupes dans d'autres croûtes donneraient-elles des résultats différents; les autres cellules du thalle mesurent 5 à 10 μ et sont semblables à celles qui ont été décrites dans les autres échantillons de cette espèce.

Dans l'échantillon étudié, la croûte est formée par la superposition de quatre thalles, chacun d'eux constitué par un hypothalle très peu développé, formé de 1 à 3 files, et par un périthalle.

Cette espèce est fixée sur un caillou où elle voisine avec *Lithophyllum* (?) *samoense, L. rasile* et *Melobesia (L.) accola.*

Répartition géographique: Océan Indien; Océan Pacifique: Sumatra, Ambon, Ile Tami au N. E. de la N^elle^ Guinée, Funafuti (Iles Ellice), Marutea (archipel des Paumotu), Mangareva, Rikitea; Ile de Pâques; San Diégo (Californie).

Corallineae.

Amphiroa Lamx.

A. fragilissima (L.) Lamx.

Lamouroux, I. V. F., Hist. Polyp. flex., Caen 1816, p. 298. Areschoug, J. E. in J. Agardh, Spec. Alg., vol. 2, pars 1, p. 531. Weber van Bosse, A. and M. Foslie, Corallin. of the Siboga-Exped., p. 89, pl. 16, figs. 1, 2, 5. — *Corallina fragilissima* L., System. nat., ed. 12, vol. 1, p. 1305.

f. *fragilissima* (Lamx.) Weber-van Bosse, l. c. A slender form in which the nodes are not much swollen. In the central strand are mostly 3, sometimes only two rows of long cells between each row of short cells. The long cells measure about 55 μ.

Area of distribution: West Indies, Pacific and Indian Oceans.

A. Yendoi nov. spec. — Fig. 33.

Thallus caespitosus e disco basali plano et filis erectis compositus. Discus basalis expansus substrato adhaerens.

E disco surgunt fila erecta, teretia, 250—300 μ lata, simplicia (raro subdichotomo) et leviter regulariter constricta, articulata.

Singuli articuli plerumque ternas interdum plures constrictiones amplectuntur.

Articuli strato corticali tecti, nodi nudi; cortex e cellulis subrotundis in series breves ex parte interiori ortus.

Stratum thalli inerioris e cellulis diversae longitudinis compositum est, 1) brevibus, 2) sublongis, 3) longis; hae in zonas transversales ordinatae regulariter alternant.

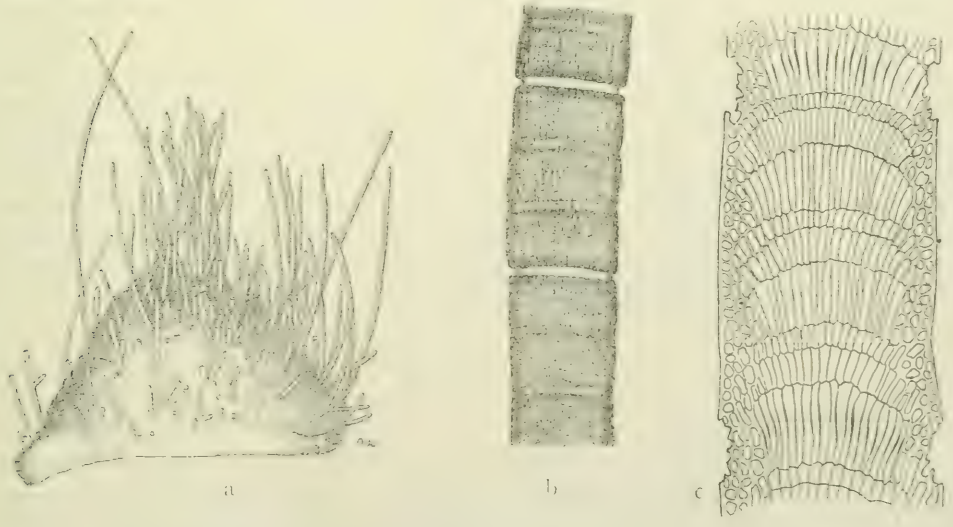

Fig. 33. *Amphiroa Yendoi* nov. spec. **a** Habit of plant, $^{3}/_{1}$; **b** part of thallus, c. $^{60}/_{1}$; **c** length section, c. $^{150}/_{1}$.

On a shell a small tuft of a tiny *Amphiroa* was found which I am unable to refer to any known species. I name it *A. Yendoi* in memory of my regretted Japanese colleague, who has published so many valuable papers on the *Corallinaceae*.

The plant was not much more than 1 cm high; its thallus is terete, rather stiff, erect, much calcified, about 250—300 μ in diameter. It is regularly constricted, broader portions, about twice as wide as high, regularly alternating with slight annular constrictions (comp. Fig. 33 b). Generally every third constriction represents a node (Fig. 33 b), but sometimes the joint is composed of more than three segments, 4—5 or even more having been found.

A longitudinal section of the thallus (Fig. 33 c) shows that the central strand is rather regularly stratified, a sheet of long cells being followed by another of short ones, this again by intermediate ones, then a second layer of long cells and so forth.

This central strand is densely covered by a thick cortical layer formed by small cells. The nodes correspond to a layer of long cells (Fig. 33 c); the cortical layer splits along the middle of this layer and the cells get a more corneous consistence. Within the joints, the constrictions are, too, found just above the row of long cells. The long cells measure c. 80 μ, the medium c. 35 μ and the short c. 15 μ.

Regarding the ramification I can only state that nearly all the shoots were simple. Only a few of the longest had divided subdichotomously. The plant was quite sterile.

YENDO and especially Mme. WEBER have shown that the anatomical structure of the central strand is of great systematic importance in the Corallinaceae, the genus *Amphiroa* being characterised by 1, 2, 3 or more rows of long cells alternating with a row of short ones. Further, the number of cell rows in the node is of systematic value.

As stated above the present species has one cell row only in the nodes and according to the analytical key found in Mme. WEBER's work on the Corallinaceae of the Siboga, p. 99, this is the case only in one species, viz. *Amphiroa valonioides* Yendo. This species is described by YENDO in his paper: »Corallinae verae Japonicae» (Journal of the College of Science, vol. 16, Tokyo 1902). To judge from his description and figures this resembles the present species in size and general appearance but seems to be more branched (as mentioned above, the specimen of *A. Yendoi* is mostly unbranched), the regular constrictions in the latter are wanting and, in the central strand, there are according to fig. 3, pl. 1 of YENDO four rows of different length regularly alternating, while only three rows of cells are found in our plant as described above.

Area of distribution: Endemic.

Jania Lamx.

J. tenella Kütz.

KÜTZING, Tab. Phycol., p. 41, tab. 85, fig. II. WEBER, A. and M. FOSLIE, The Corallinaceae of the Siboga Expedition, p. 108.

I have referred some small, 4—5 mm high repeatedly dichotomous plants to this species. The joints are about 100 μ broad and 2—3 times as long in

the basal part. Higher up they are longer and thinner. The uppermost joint is 46 μ broad only.

The conceptacles are about 240 μ broad.

Area of distribution: Australia, Malay Archipelago, Easter Island. Also Mediterranean?

Fam. Ceramiaceae.

Ptilothamnion Thur.

P. Pluma (Dillw.) Thur. — Fig. 34.

Thuret, G., in Le Jolis, Liste Alg. Cherb., p. 118. Bornet et Thuret, Notes algologiques, p. XII et 179, pl. 46. — *Conferva Pluma* Dillw., Intr. n. 119, tab. F. — *Callithamnion Pluma* Ag., Spec. II, p. 162. Harvey, Man., p. 115; Phycol. Brit., pl. 296. Hauck, Meeresalgen, p. 75, fig. 27.

Growing upon a stone among several other algae some small specimens were found which I have referred to *P. Pluma*. A safe determination is hardly possible, the material being sterile with the exception of a few tetrasporangia. Should the determination prove correct, the occurrence of a species hitherto known only from the Mediterranean Sea and adjacent parts of the Atlantic, in the Pacific Ocean, is very remarkable.

Below I want to give a short description and some figures of the plant to show how well it accords with the descriptions of *P. Pluma*, f. i. with that of Hauck, l. c.

The horizontal creeping and ramified filaments (Fig. 34 a) are fixed to the substratum by means of vigorous rhizoids ending in a broad disc and composed of cylindrical cells about 16 μ broad and as much as 70 μ long. The erect filaments (Fig. 34 b) are unbranched below; thence every cell carries two opposite branchlets, all lying in the same plane. The branchlets are directed upwards, under an angle of about 30°. They are composed of mostly

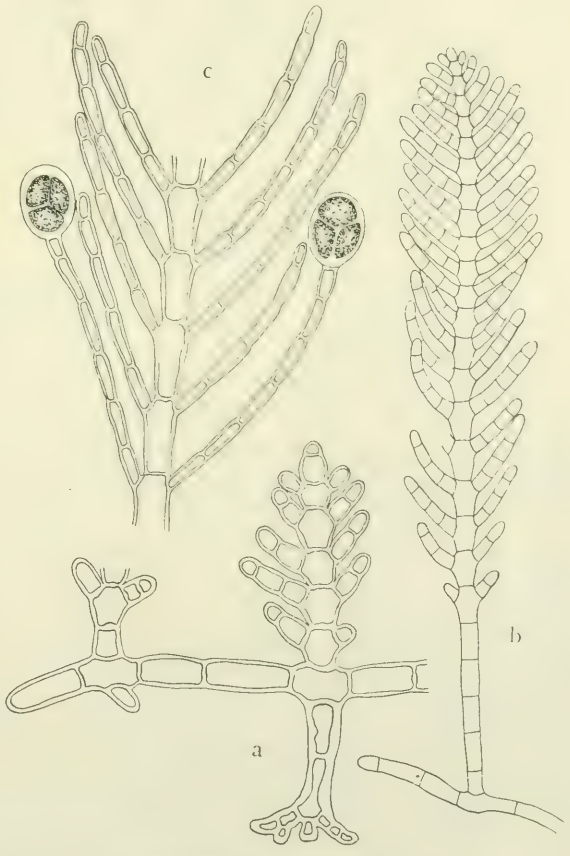

Fig. 34. *Ptilothamnion Pluma* (Dillw.) Thur. **a** part of creeping filament with rhizoid and erect branches, c. $^{280}/_{1}$; **b** erect shoot, c. $^{150}/_{1}$; **c** part of thallus with tetrasporangia, c. $^{240}/_{1}$.

4 (3—7) cells and are about 12—13 μ thick. The cells in the main axis are c. 20 μ thick and have a length of c. 40 μ in the middle of the axis.

The tetrasporangia (Fig. 34 c) are terminal on the pinnules. They measure 35 × 27 μ. Thus, the tetrasporic plant seems to agree well with the Mediterranean species, but for an exact determination sexual plants are essential.

While our plant seems to have occurred in a very similar locality as *Ptilothamnion lucifugum* Cotton, the Irish plant differs from the present one by its bifid branchlets, agreeing in this respect with the Canarian *Ptilothamnion micropterum* (Mont.) Born. Also *Ptilothamnion bipinnatum* (Collins and Hervey) Howe differs much from the present plant among others by the ramose pinnules.

Area of distribution: Mediterranean and adjacent parts of the Atlantic; Easter Island.

Callithamnion Lyngb.

C. paschale nov. spec. — Fig. 35.

C. caespitosum, ca. 4 mm altum. Rami erecti in parte basali nudi, deinde subdistiche ramosi. Rami alterni in plantis ♂ et ⊕ simplices, in ♀ superne pinnati.

Cellulae majores in parte basali ca. 90 μ latae, in parte superiore gradatim tenuiores et 15 μ latis, apice ramorum late rotundato.

Tetrasporangia obovata, ca. 58 μ longa et 47 μ lata, et antheridia utraque in interiore latere pinnularum posita.

Cystocarpia gemina rotundata in pinnis subterminalibus sita.

The height of the few plants I have seen only reaches about 4 mm. The basal part consists of irregularly ramified decumbent filaments originating from the lowermost cells of the erect filaments. These filaments are fastened to the substratum by means of vigorous rhizoids (Fig. 35 d).

From this basal system the erect branches grow up forming small tufts. They are bare in their lower half, ramose in the upper. The branching is very regularly distichous with alternating branches growing out from the upper end of each cell. In the male and tetrasporic plants all the branches are simple.

In the more vigorous female plant (Fig. 35 a) the branches in the upper part of the plant repeat the ramification of the main axis. These branch-systems of second order turn their edges against the mother branch, the whole system lying in the same plane.

In the main filaments the lowermost cells measure c. 90 μ across gradually decreasing upwards, so that the tip is rarely more than about 15 μ thick. The cells are rather short, generally only 1—1 $^1/_2$ times their length. The top cells are obtuse. Hairs do not occur. The cell wall is thick, attaining c. 4 μ in the larger cells of the main filaments.

As is usually the case in *Callithamnion* the tetrasporangia (Fig. 35 c) occur on the inner side of the pinnules; they are obovate, c. 58 × 47 μ. The antheridial stands (Fig. 36 b) occupy corresponding places, gradually covering almost the entire upper side of the pinnules.

The female plant (Fig. 35 a) is more robust. The binate cystocarps are developed near the top; in the largest ones observed the halves were almost spherical, measuring c. 130 μ. Young stages were not observed. No trace of a cortical layer could be found.

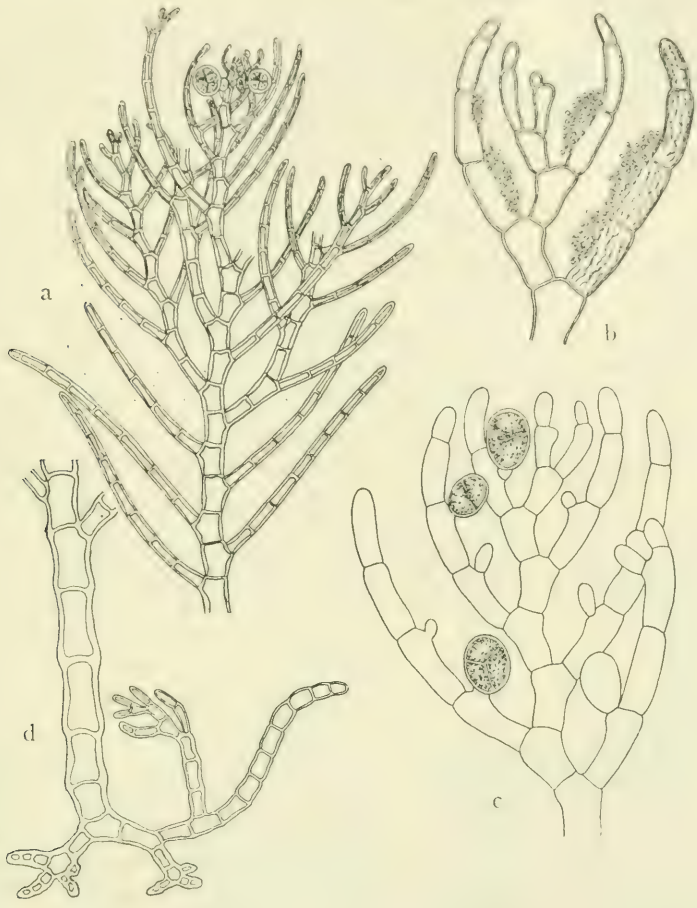

Fig. 35. *Callithamnion paschale* nov. spec. **a** part of ♀ specimen, c. $^{60}/_{1}$; **b** of ♂ specimen, c. $^{180}/_{1}$; **c** of tetrasporic plant, c. $^{150}/_{1}$; **d** base of a plant, c. $^{80}/_{1}$.

C. paschale recalls *scopulorum* as described by the author in »Botany of the Færöes», Part. II, p. 377. But *C. scopulorum* differs, among other things, in being often bi-tripinate, the cells in the main stem are proportionally much longer, the branches taper much more against their apex, the tetrasporangia are more spherical, etc.

C. Pennula Grunow from St. Paul's Island, Novara-Exp. p. 60, pl. 6 fig. 1, with which our new species might perhaps also be compared, is a much larger and more branched plant with a dense nest of basal rhizoids.

Area of distribution: Endemic.

Crouania J. Ag.

C. attenuata (Bonnem.) J. Ag.

AGARDH, J., Algae mediterr., 1842, p. 83.

Some fragments of a very small form were found. GRUNOW in »Alg. Novara», p. 62 mentions having found a very delicate form at Tahiti.

Area of distribution: Mediterranean Sea, warmer shores of the Atlantic and Pacific Oceans.

Carpoblepharis Kütz.

C. Schmitziana (Reinb.) Okamura. — Fig. 36.

OKAMURA, K., On Microcladia and Carpoblepharis (Bot. Mag., vol. XIV, 1900, p. 8, pl. I, figs. 14—17. Icones of Jap. Alg., vol. I, pl. II, figs. 5—18). — *Gloiothamnion Schmitzianum* Reinbold, Hedwigia, 1895, Bd. 34, p. 205, pl. III. — *Reinboldiella Schmitziana* (Reinb.) De-Toni, Syllog. Alg., vol. IV, sect. III, p. 1498.

On a stone with several other small algae some few bits of a very delicate species were found, which I feel convinced belongs to *C. Schmitziana*, first described by REINBOLD, even if the Easter Island plant seems to be much smaller and differs a little in its habit from REINBOLD's figure.

Fig. 36. *Carpoblepharis Schmitziana* (Reinb.) Okam., fragments of plants, c. $^{90}/_{1}$.

The plant grew on a *Cruoriella* to which it is fixed by means of numerous rhizoids growing out mostly in bundles from cortical cells.

The decumbent rhizome-like parts of the thallus are about 60 μ thick. From this now and then branches are given off; some of these soon stop their growth, become more or less vertical, and reach a length of up to 200—300 μ; but most branches show an indefinite growth like the mother filament, fixing themselves to the substratum.

The erect branches become more or less flattened with a broad obtuse tip; they sometimes are as much as 50 μ wide, but often only half that size. Longitudinal growth is performed by a broad top-cell. The segments cut off often remain distinct long after they have become divided into smaller cells.

The main shoots are covered with a dense, untransparent cortex.

The material is sterile.

I have followed OKAMURA in referring this species to *Carpoblepharis*. It seems to be a highly variable plant, more so if the small reduced forms, referred here with some doubt by Mme. WEBER[1], really belong to the same species. The Malayan plant has the creeping rhizome-like base reduced to a monosiphonous filament, a rather remarkable fact.

Area of distribution: Japan, Malayan Archip., Easter Island.

[1] Liste des Algues du Siboga III, Rhodophyceae II, p. 336, figs. 126—7.

Ceramothamnion Richards.

C. Codii Richards.

Richards, Ceramothamnion Codii, A new rhodophyceous alga (Bull. Torrey bot. Club, vol. 28, p. 57).

Some few small loose-lying fragments have been found only which I think are referable to this plant. What species the host plant has been I can not say; no *Codium* was among the material handed over to me.

Dr. H. E. Petersen kindly inspected the material and confirmed the determination.

Area of distribution: Bermuda, Easter Island.

Ceramium (Roth) Lyngb.

By Dr. H. E. Petersen.

C. cruciatum Collins & Hervey. — Fig. 37.

Collins & Hervey, The algæ of Bermuda, 1917, p. 144.

In referring the specimens from Easter Island to this species I base this upon the figures of Mme. Weber, Liste des algues du Siboga, III, Rhodophyceae, p. 331.

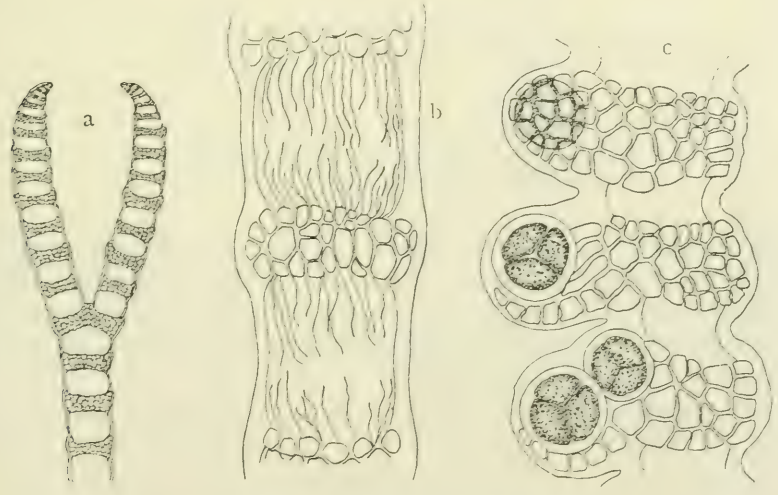

Fig. 37. *Ceramium cruciatum* Collins & Hervey. a top of filament, c. $^{60}/_{1}$; b part of filament lower down, c. $^{240}/_{1}$; c tetrasporangia, c. $^{240}/_{1}$.

According to Collins & Hervey *Ceramium cruciatum* has »cortication consisting of cells elongate in the direction of the filament». Mme. Weber having seen an original specimen of this species now gives a figure of a cortical belt, in which the cells are not arranged in longitudinal rows as in the figures

of COLLINS and HERVEY. As the specimens from Easter Island (Fig. 37 b) regarding the shape of the cortical cells agree with the statement of Mme. WEBER I think I need not lay stress upon the remarks of COLLINS and HERVEY as to his point.

Specimens with cystocarps and tetraspores (Fig. 37 c) were present. In the tetrasporic specimens the tips of the filaments were flattened in a peculiar way (Fig. 37 a).

Area of distribution: Bermuda, Celebes, Easter Island.

C. Skottsbergii H. E. Petersen, nov. spec. — Fig. 38.

In the material a small *Ceramium* is found characterized by very narrow cortical belts in which several pluricellular spinelike hairs are present. I consider this plant to be a new species. Here the diagnosis:

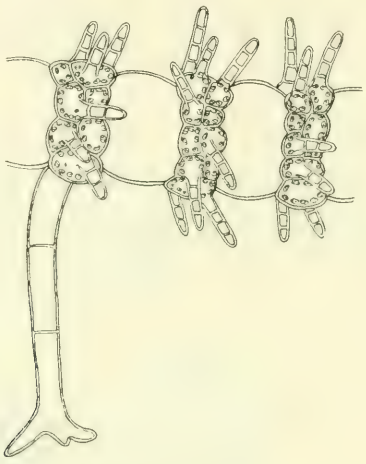

Fig. 38. *Ceramium Skottsbergii* nov. spec.
Part of filament, showing spinose cortical belts, c. $^{180}/_{1}$.

Fronde repente, irregulariter ramosa; zonis semper discretis, paucis cellulis constantibus, altitudine zonarum 15—25 μ, sæpe duobus cellulis formata. Cellulis axialibus usque ad 80 μ altis; 70—75 μ latis. Pilis verticillatis e cellulis zonarum formatis, articulatis, ex 3 cellulis compositis, c. 30—35 μ longis, c. 8 μ latis, obtusis.

Organa fructificationis non visa.

Area of distribution: Endemic.

Fam. Rhodomelaceae.

Laurencia Lamour.

L. claviformis nov. spec. — Fig. 39.

Planta caespitosa, ca. 1 $^{1}/_{2}$—2 cm alta, e ramis basalibus repentibus et ramis erectis composita. Rami basales rhizoideis robustis saxo adfixi. Rami

erecti, teretes, clavati, in inferiori parte ca. 1 mm lati, in superiori ca. 2 mm, apice late rotundato, aut simplices, aut ramosi, ramulis clavatis, sparsis, paucis, irregulariter exeuntibus, interdum ramosis, ramellos in superiore parte gerentibus.

Tetrasporangia sparsa in superiore parte ramorum orta.

To judge from the specimens collected the plant forms low dense tufts, ca. $1\,^1/_2$—2 cm high, on rocks between tide marks.

The decumbent creeping filaments, about 1—$1\,^1/_2$ mm thick, are fastened to the substratum by means of short, thick, vigorous hapters (Fig. 39 a). From these prostrate filaments erect ones grow up. These measure at their base about 1 mm in diam., gradually thickened upwards, attaining twice their basal diameter and slightly clavate.

Of the erect filaments the more robust ones are branched in their upper half. They carry some few lateral branches, especially near their upper end, where several may be clustered together. The branches grow out to all sides without any order, they are clavate like the primary branch and sometimes carry subterminal branchlets.

Tetrasporic plants only were gathered. The tetraspores are found in the cortical layer, scattered over the surface, especially in the upper end of the branches.

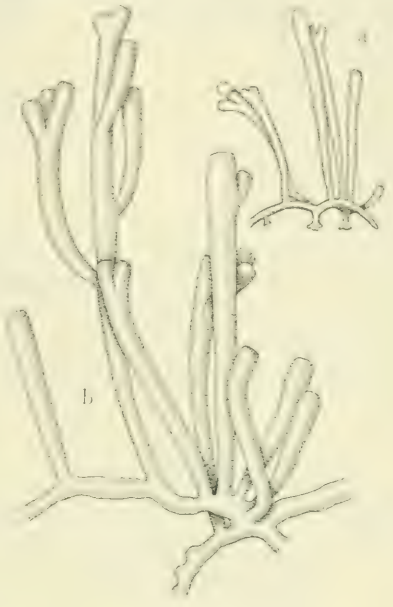

Fig. 39. *Laurencia claviformis* nov. spec. Parts of plants, a c. $^2/_1$, b c. $^5/_1$.

As to the limitation of the species in this troublesome genus I refer to my remarks in »The marine Algae of the D. W. I», vol. II, p. 244. I regret that, in describing a new species, I add to the difficulties. Nevertheless I think this is the best way to take until the very desirable revision of the whole genus has been undertaken.

The present plant surely comes near a group of species (f. i. *L. perforata, radicans, vaga, decumbens* etc., comp. KÜTZING, Tab. Phycol., vol. XV, pl. 49—51) about which J. AGARDH, in »Epicrisis», p. 649 says: »nec mihi patet quomodo distinguantur».

Area of distribution: Endemic.

Chondria Ag.

Subgenus **Coelochondria** Falkenb.

Ch. repens nov. spec. — Figs. 40, 41.

Thallus teres, minutus, ca. 1—2 mm altus et 200—400 μ latus, in aliis algis epiphyticus, partim e ramis repentibus, rhizoideis brevibus robustis adfixis, partim e ramis curtis, erectis constructus.

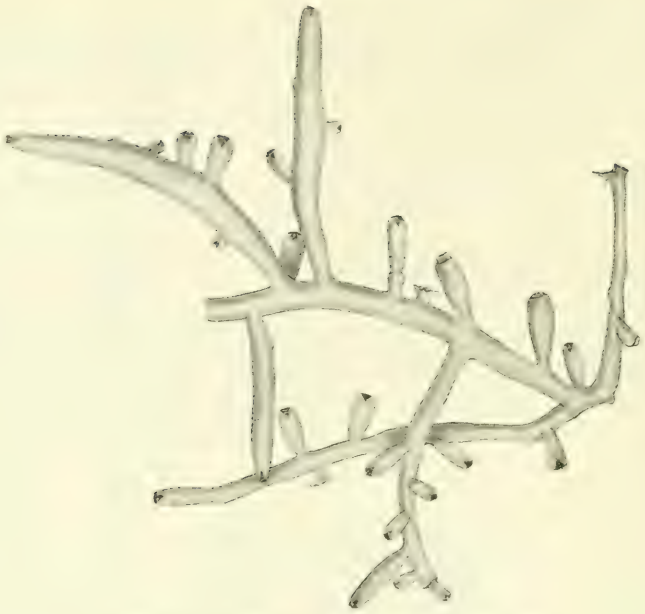

Fig. 40. *Chondria repens* nov. spec., part of specimen, c. $^{10}/_{1}$.

Rami repentes ramosi, ramis aut decumbentibus, repentibus, axi primario similibus, aut erectis, curtis, obovatis, simplicibus, ca. $^{1}/_{3}$—1 mm altis et 300—350 μ latis, tetrasporangiis instructi.

Tetrasporangia in superiori parte ramorum sparsa, ca. 80—90 μ lata.

Of this little plant some very few fragments are found only, the longest specimen being about 1 cm long.

The terete thallus has creeping basal filaments fixed to other algae by means of short thick hapters formed by a bundle of rhizoids. From this basal part shorter or longer branches are given off. Some of these branches may grow out to long shoots like the mother branch fixing themselves to the substratum in a similar way but most of the branches remain short, erect and become fertile. Gradually they become more or less distinctly clavate and produce tetrasporangia in their upper end. The ripe tetrasporangia are about 80—90 μ in diameter.

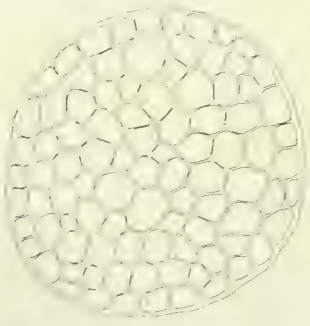

Fig. 41. *Chondria repens* nov. spec. Cross section of thallus, c. $^{125}/_{1}$.

The cortical layer is rather thick and the central strand generally not visible. Seen from above the surface cells are roundish to polygonal with rather thick walls.

A transverse section (Fig. 41) shows that the thallus is composed of a parenchymatic tissue, the central axis not being especially distinct.

In »Algues du Siboga», III *Rhodophyceae,* p. 349 Mme. WEBER has described a small species *Chondria minutula*, of nearly the same size and habit, but otherwise widely different, belonging as it does to the group *Euchondria* Falkenb.

Area of distribution: Endemic.

Polysiphonia Grev.

P. spec.

A small antheridial plant with four pericentral cells. From a decumbent filament fixed to the substratum by means of rhizoids erect filaments arise. The filaments are about 50 μ thick and the length of the cells about 80 μ.

The specimen bears considerable likeness to ASKENASY's[1] figure of an antheridial plant of *Polysiphonia mollis* Hook f. et Harv.

Herposiphonia Naeg.

H. tenella (C. Ag.) Naeg. — Figs. 42, 43.

NÄGELI, C., Herposiphonia (in SCHLEIDEN und NÄGELI, Zeitschr. f. wiss. Bot., 3—4 Heft, 1846, p. 238, tab. VIII). FALKENBERG, P., Rhodomelaceen, p. 304. BÖRGESEN, F., Marine Algae D. W. I., vol. II, pp. 286 and 472.

In referring the plant from Easter Island to this species it must be pointed out that before we know the male plant no exact determination can be made; cfr. my remarks l. c., p. 470.

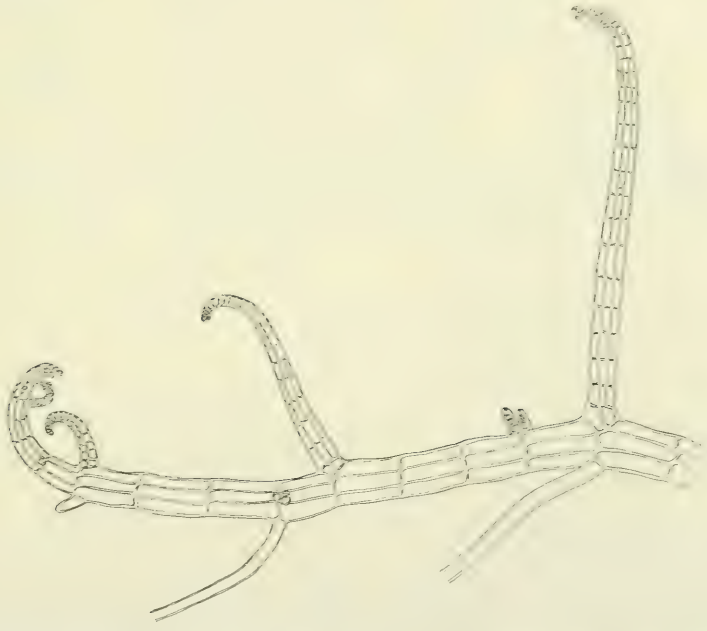

Fig. 42. *Herposiphonia tenella* (C. Ag.) Naeg., part of specimen growing on *Valonia*. C. $^{15}/_{1}$.

Sterile specimens were found on *Valonia ventricosa*. They had 5—8 pericentral cells. The creeping, prostrate main filaments are fixed to the wall of the host by means of vigorous rhizoids quite in the same way as found in the West Indian plant.

[1] ASKENASY, E., Ueber einige australische Meeresalgen. Flora, 1894, p. 13, pl. 4, fig. 22.

The mutual arrangement of the branchlets and branches is seen in Fig. 42. This shows that the branchlets are, as a rule, developed from every fourth segment; the next has a branch and the branches alternate on the right and left side of the thallus. But it happens that the branchlets are developed from every third or rarely from every second segment. The branchlets are of rather variable length; in some specimens I have counted up to 50 segments. The segments are longest in the middle of the branchlets, shorter near the base and summit. The diameter of the branchlets is about 50 μ. The trichoblasts are as a rule poorly developed.

On *Zonaria variegata* I found some few fragments of an other form, both cystocarpic and tetrasporic, but unfortunately no male plant.

Of the female plant Fig. 43 gives an illustration; it is much more robust than the sterile one from *Valonia*. It also differs from this by the scarce development of branches, which generally are arranged without any order.

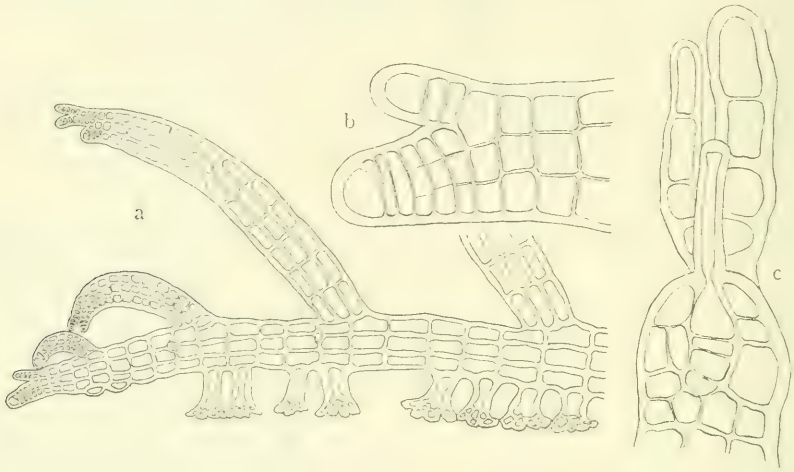

Fig. 43. *Herposiphonia tenella* (C. Ag.) Naeg. ♀. **a** part of creeping plant, c. $^{60}/_{1}$; **b** growing apex of same, c. $^{750}/_{1}$; **c** young cystocarp, c. $^{750}/_{1}$.

The trichoblasts are well developed in the female plant. The cystocarps are formed in the second segment of the trichoblast, the lowermost becoming polysiphonous. The form of the young cystocarp (Fig. 43 c) very much resembles what I have found in *Lophosiphonia cristata* (comp. my fig. 432 l. c.). The trichogyne is thick and comparatively short. The ripe cystocarp is urn-shaped with a short broad neck; it is about 550 μ long and 460 μ broad.

The tetrasporic specimens have longer and much more slender branchlets than the female plant; in the mutual arrangement of the branchlets and branches they agreed with the plant found on *Valonia*. The tetrasporic branchlets are about 60 μ thick and 1,5 mm long.

Area of distribution: Mediterranean Sea, Morocco, West Indies, Malayan Archipelago, Easter Island.

A small piece of a plant with 11 pericentral cells may perhaps belong to *H. subdisticha* Okamura (Bot. Mag. XII, 1899, p. 11, pl. I figs. 12—14). It resembles the figures quoted, but being sterile and lacking growth points it is insufficient for a safe determination.

Dipterosiphonia Schmitz. & Falkenb.

D. dendritica (Ag.) Falkenb. — Fig. 44.

Falkenberg, P., Rhodomelaceen, p. 324. Börgesen, F., Mar. Alg. D. W. I., p. 302. — *Hutchinsia dendritica* Ag., Systema, p. 146; Species Alg., vol. II, p. 104. — *Polysiphonia dendritica* J. Ag., Spec. Alg., vol. II, pars 3, p. 916.

Some small sterile fragments were found on *Laurencia claviformis*. In one respect it differs essentially from the West Indian plant, as described by me l. c.; in this, the branchlets with definite growth are always undivided, while, in the Easter Island form, they often bear a few spine like side branches. These are mostly situated above the middle of the branchlets and their number rarely surpasses two or three. They form acute angles with the main branch.

Otherwise, the Easter Island plant seems to agree perfectly with the West Indian one. Like this it has five pericentral cells, three on the upper side, two below, and it is attached to the host plant by meams of vigorous hapters, which pierce the sides of the host plant like claws.

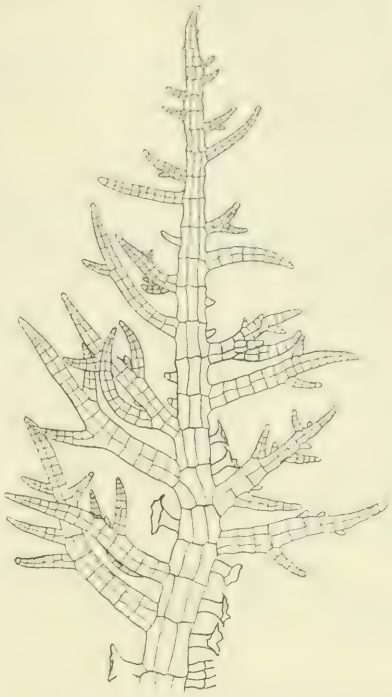

Fig. 44. Part of a specimen of *Dipterosiphonia denaritica* (Ag.) Falkenb. C. $^{80}/_{1}$.

Area of distribution: Brazil, West Indies, Australia, Easter Island.

Dasya C. Ag.

D. villosa Harv.

Harvey, W. H., Algæ of Tasmania, London Journal of Botany, vol. III, 1844, p. 433.

The specimens had been preserved in formaline and were in a state of dissolution, falling to pieces at the least touch. Nevertheless I think the determination is right, the plants being in good accordance with the description of Harvey and with Kützing's Figure; I have also been able to compare them with a specimen of Harvey's Australian Algæ, No. 218 from Van Diemen's Land.

When young the stichidia are rather short and thick, ovate to lanceolate, when older they become longer and subcylindrical with attenuated summit, but perhaps the great length is due to the bad preservation, all the tetraspores having fallen out and the cells getting more or less separated.

Area of distribution: Tasmania, Easter Island.

Falkenbergia Schmitz.

F. rufolanosa (Harv.) Schmitz. in ENGLER u. PRANTL, Natürl. Pflanzenfamilien, p. 479.

FALKENBERG, P., Rhodomelaceen, p. 690. — *Polysiphonia rufolanosa* Harvey, Marine Botany of W. Austr., no. 87 in Trans. Acad. vol. XXII; KÜTZING, Tab., Phycol., vol. 14, pl. 54.

Only a few small pieces of this plant were found, too small in fact for a safe determination. In their general appearance the specimens resemble the figure of KÜTZING; this is, however, as pointed out by FALKENBERG, not very accurate. The thallus was about 40 μ thick and the length of the cells amounts to 30 μ.

On the other hand, it cannot be denied that this plant seems to concord with the form of *Falkenbergia Hildebrandii* which I discovered in the West Indies (l. c., p. 331). According to my note, these species most probably are mere forms of the same species, a conclusion to which YENDO[1] also has arrived, having been able to compare his plant with the original specimen in Herb. HARVEY in Dublin and referring to my figures and description of the West Indian plant.

Area of distribution: Australia, Japan, Malayan Archipelago, and most probably, West Indies etc.

Fam. Delesseriaceae.

Nitophyllum Grev.

Fig. 45. *Nitophyllum* spec., ♂ specimen. C. $^{12}/_{1}$.

N. spec. — Fig. 45.

A small antheridial plant of a *Nitophyllum* was found mixed up in a *Galaxaura* tuft. The height of the whole plant found was 6 mm only. It has no veins, is monostromatic and belongs to the group *Leptostroma* of J. AGARDH. The growth takes place by means of a well developed top-cell.

The antheridial sori are situated in the middle of leaf-like thallus-segments. They are found on both sides of the thallus.

The cells of the thallus are polygonal with thick walls; their diameter is about 40 μ.

To the group *Leptostroma* J. Agardh refers 3 species and in »Sylloge Algarum» DE-TONI mentions a few additional species,

[1] YENDO, Notes on Algae new to Japan, IV (Bot. Mag., vol. XXX, 1916, p. 63).

all from the European Atlantic coast and the Mediterranean Sea. Most likely therefore the present plant is the representative of a new species. In order to describe it we must know at least also the tetrasporic plant, as the male plant in *Nitophyllum* is often very much reduced in size.

Gymnogongrus Mart.

G. aequicrassus nov. spec. — Figs. 46, 47.

Frons caespitosa, e filis decumbentibus, repentibus et filis erectis composita.

Fila decumbentia irregulariter ramosa, aggregata et inter se contexta.

Fila erecta teretiuscula, interdum simplicia saepe di- vel trichotoma, ad apicem versus non attenuata, apex late rotundatus.

Cystocarpia singulas apicibus frondis immersa, rotundata, superne in partem sterilem attenuatam exeuntia.

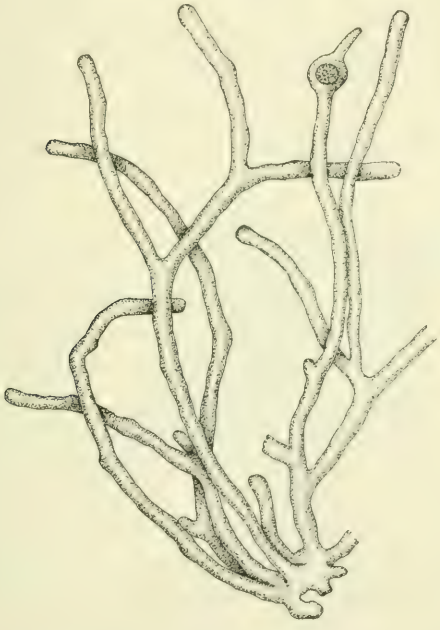

Fig. 46. *Gymnogongrus aequicrassus* nov. spec. C. $^{4}/_{1}$.

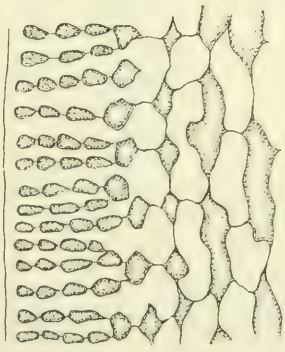

Fig. 47. *Gymnogongrus aequicrassus* nov. spec. Length section of thallus, c. $^{450}/_{1}$.

The plant grows gregariously in dense tufts about 2—3 cm high upon rocks between tide marks.

The tuftlike growth originates from the numerous erect filaments growing out from the prostrate creeping ones. The latter filaments are irregularly bent and branched, gradually more or less united into an irregularly lobed disc. The erect filaments are nearly terete or somewhat compressed, the transverse section being mostly oval. The filaments are a few times dichotomously, rarely trichotomously forked, but quite simple ones also occur. The surface of the

thallus is uneven and irregularly waved. The tips of the shoots are broadly rounded. The angle between the branches approaches 90°.

A few cystocarps occur; these are found near the end of the branches and are almost globular. Above the cystocarp a short sterile narrow prolongation is observed.

The plant is of a rigid cartilaginous or corneous texture.

On a longitudinal section of the thallus (Fig. 47) we find that the subcylindrical cells in the centre are arranged more or less in rows; outwards the cells grow shorter with very thick walls and gradually pass into the cortical layer, composed of short rows of small oval cells — upon the whole a picture quite like that of *Chondrus crispus* as given by KYLIN in Studien über die Entwicklungsgeschichte der Florideen (K. Svenska Vetenskapsakad. Handlingar. Bd. 63, 1923).

The new species appears to be most nearly related to the small species *G. densus* and *G. pygmaeus.*

Area of distribution: Endemic.

Fam. Sphaerococcaceae.

Hypnea Lamx.

H. Esperi Bory. — Fig. 48.

BORY, Voyage de la Coquille, p. 157. KÜTZING, Spec. Alg., p. 759; Tabul. Phycol., vol. 18, pl. 26, a, b, c.

Fig. 48. *Hypnea Esperi* Bory. Part of specimen with a tetrasporangium sorus. C. $^{25}/_{1}$.

The thallus forms small entangled masses among other algae. The filaments are irregularly ramified, often antlerlike in shape, the summit of the filaments often being somewhat curved with short, spine-like side-branches gradually growing out from the convex side. The branches are sometimes short, spinelike, sometimes long and of indefinite growth. The tetrasporangia are formed in the branchlets.

When a branch comes near a favourable substratum short thick discoid hapters are formed by means of which the plant is fastened to other algae. In the same way the branches frequently anastomose.

The terete thallus is 400—500 μ thick.

The specimens found seem to be in good accordance with the fig. of KÜTZING in Tab. Phycologicae (l. c.).

This plant is closely related to the form I called *Hypnea spinella* in my West

Indian work (p. 384, fig. 369). The form figured is somewhat more densely branched and the thallus slightly coarser (500—600 μ), but otherwise they seem to agree so well with each other that I am inclined to regard them as forms of the same species.

H. Esperi differs from *H. pannosa* J. Ag., collected on the Pacific coast of Mexico (San Augustin, LIEBMANN) by its more slender and less ramose thallus, *H. pannosa* being described as »densissime intricato decomposito-ramosissima».

Area of distribution: Brazil, Chile, Australia, Easter Island.

Fam. Rhodymeniaceae.

Chrysymenia J. Ag.

C. Skottsbergii nov. spec. — Figs. 49, 50.

E callo radicali expanso frondes erectae, plerumque 1—2 cm altae, oriuntur, caespitem densum et expansum formantes.

Caules crassius filiformes, in parte basali robustiores (ca. 1 mm lati) superne gradatim tenuiores et ramosi, 5—6 vel plures ramos vesicaeformes gerentes.

Vesiculae subglobosae-pyriformes, 4—5 mm latae et 5—6 mm longae.

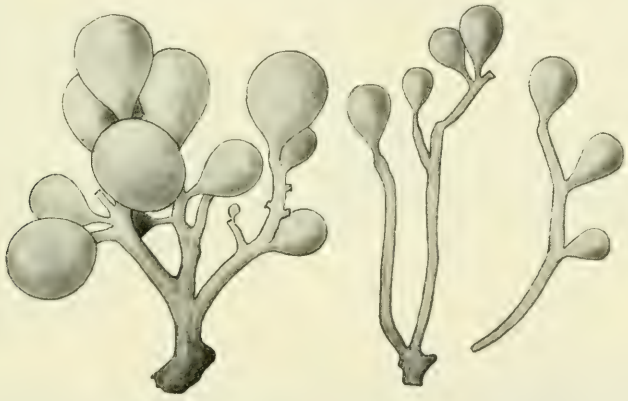

Fig. 49. *Chrysymenia Skottsbergii* nov. spec., parts of specimens. C. 2,5/1.

This fine plant forms low, ca. 1—2 cm high, dense tufts on *Lithothamnion* to which it is fastened by means a large irregular disc. From this the erect main filaments (stems) arise. These are mostly undivided in their lower half, irregularly ramified to all sides in the upper, the branches and, if these are branched again, the branchlets all ending in a vesicle. In this way each main branch may carry up to ten or even more vesicles.

The stem is thickest, c. 1 mm, in the basal part, tapering gradually upwards.

The vesicles are spherical-pyriform, about 4—5 mm broad and 5—6 mm long.

The stem is solid. A transverse section (Fig. 50 a) shows a cortical layer consisting of quite smal roundish thick-walled cells arranged in more or less

distinct rows; inwards the cells gradually increase in size forming an even transition to the medullary tissue. On the cross section this is composed of roundish cells.

A longitudinal section (Fig. 50 b) of the stem shows that the cells of the cortical layer are of nearly the same shape: roundish to oval. The cells of the medullary tissue on the other hand are long, subcylindrical with oblique cross walls. Between the long cells short ones, often arranged in rows, are interposed here and there.

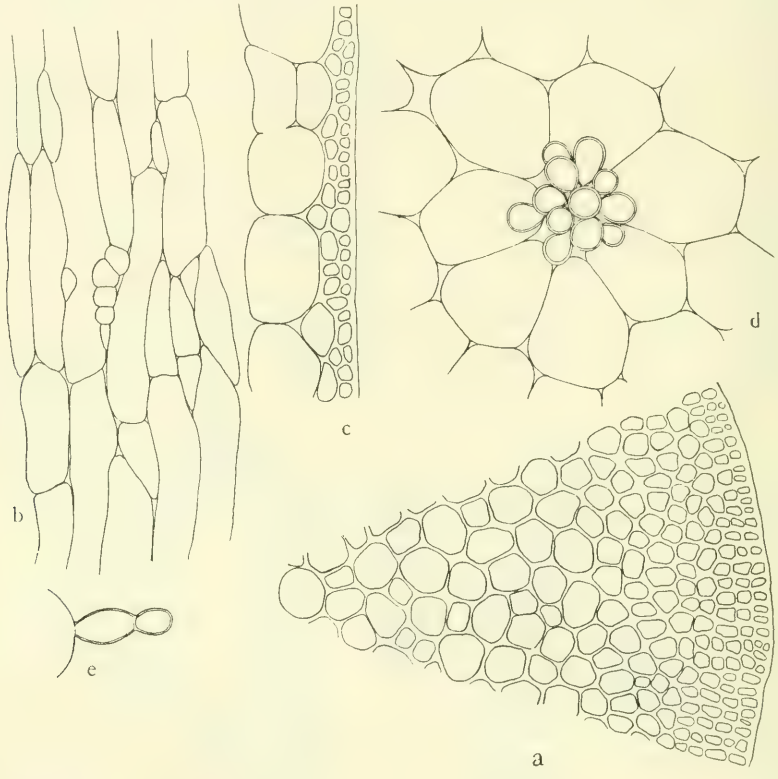

Fig. 50. *Chrysymenia Skottsbergii* nov. spec. **a** cross, **b** length section of stipes; **c** cross section through wall of vesicle; **d** inner surface of wall of vesicle with a cluster of glands; **e** two-celled gland. All c. $^{180}/_{1}$.

A cross section of the vesicles (Fig. 50 c) shows that the wall consists of a single layer (rarely two) of large rounded-rectangular cells, which are covered by a cortical layer of small cells. Opposite the centre of the large cells one or two cortical layers are present, while opposite the cross walls separating the large cells, where more space is left, we find this space occupied by a cell larger than the cortical ones.

Seen from above the large cells in the wall of the bladder are polygonal with rounded corners (Fig. 50 d). The cavity is filled with mucilage. On the inner side of the wall, facing the cavity, we find the glands characteristic of *Chrysymenia*. These occur in groups (Fig. 50 d), but not in great number.

On the other hand the glands themselves are rather large and each group mostly consists of a good number of glands (10—20 or more). They are gathered upon a smaller cell situated among the large wall cells; sometimes, too, this small cell carries another smaller one upon which the glands are borne. The glands are oblong, about 20 μ broad and 40 μ long.

In a few cases I have found the glands divided into two cells (Fig. 50 e).

All the material was sterile.

Of the known species of *Chrysymenia,* the present one is most closely related to *C. Uvaria* (L.) J. Ag. (esp. the Mediterranean form), *pyriformis* Börgs. and *microphysa* Hauck. It differs from *C. Uvaria* in growing less high, by the much smaller number of vesicles on each main stem, by the larger, shortly pedicellate vesicles, further by the gland-cells being larger and arranged in dense groups, while in *C. Uvaria* these cells are small, rounded and scattered singly over the wall (comp. my fig. 388 in Mar. Algae D. W. I., vol. II, p. 403).

From *C. pyriformis* it also differs in the lower, more condensed habit, in the irregular branching and shortly pedicellate vesicles, while, in the former, generally also in *C. Uvaria,* the sessile vesicles form a raceme along the main stem and branches. *C. pyriformis* has larger and more pyriform vesicles. The cortical layer in the vesicles is thicker and more firmly built in *C. Skottsbergii.* The glands are grouped in the same manner in both, but they are larger in the latter and more numerous to each group. The quite robust stem is also more strongly built in the new species. It should be remembered, that this was collected in tide-pools, while *C. pyriformis* is a sublitoral species. For more details I refer to my description of the latter.

Finally, *C. microphysa* is a much smaller plant, mostly with a single terminal vesicle, less often with one or two lateral branches in addition. For a detailed description see P. KUCKUCK, Beitr. zur Kenntnis der Meeresalgen. 13 (Wiss. Meeresuntersuchungen, N. F. Bd. V, Abt. Helgoland, 1912).

Area of distribution: Endemic.

Champia Desv.

Ch. sp.

In a glass tube with various algae a small fragment of a *Champia* was found. Had it come from the West Indies I would have named it *Ch. parvula* without hesitation, but as this species has not been reported from the Pacific with certainty, I prefer to leave it unnamed, the more as it is sterile, the arrangement of the tetrasporangia remaining unknown.

10. Ein neues Sargassum von der Osterinsel.

Von

L. GUNNAR SJÖSTEDT.

Mit 5 Textfiguren.

Von einem *Sargassum*, der auf der Osterinsel (Isla de Pascua) (»Litoral, unweit Hango Pico, nicht ganz trocken gelassen») von Professor Dr. C. SKOTTSBERG am 26. Juni 1917 erbeutet wurde, hat der Verfasser Exemplare zur Bestimmung bekommen. Das fragliche *Sargassum* hat sich bei vorgenommener Untersuchung als eine neue Art erwiesen, deren Diagnose ich unten gebe.

Sargassum Skottsbergii nov. spec. Fig. 1—5.

Planta dioica. Thallus ca. 30 cm altus. Stratum basilare caules principales breves, longitudine 2—3 cm, teretiusculos ferens, ramis primariis numerosis, longis, erectis, inermibus. Folia plerumque 9—12:plo longiora quam latiora. Folia plantae masculae superiora anguste lanceolata, acuta, indivisa, minute et obsolete

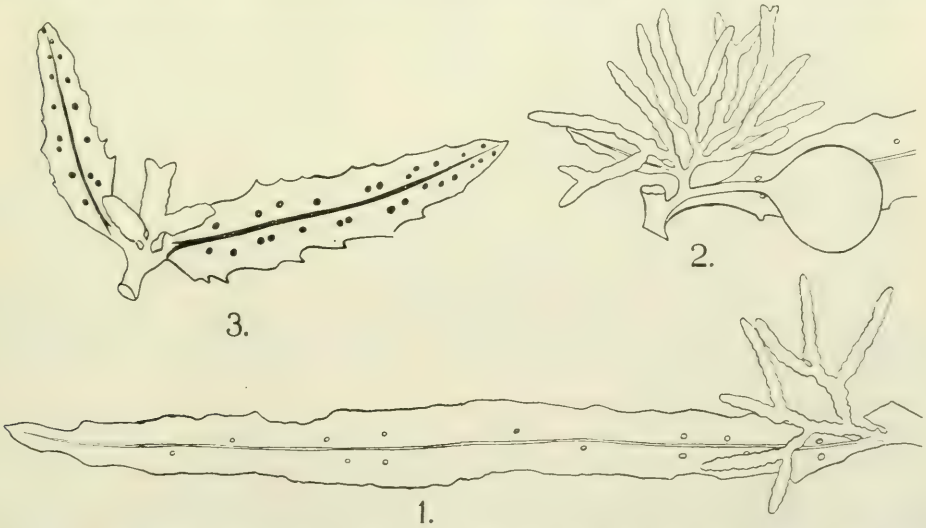

Fig. 1—3. *Sargassum Skottsbergii*. Fig. 1—2. Männliches Receptaculum. Fig. 3. Weibliches Receptaculum. Vergr. 3 × 1.

denticulata (vel hinc inde integerrima), longitudine 20—30 mm, latitudine 2—3 mm. Cryptostomata pauca, parum conspicua (folia nonnulla eglandulosa), per

Fig. 4. *Sargassum Skottsbergii.* Stücke männlicher Pflanzen. C. 1/2.

singulam seriem utroque latere costae folii disposita. Folia superiora plantae femineae breviora, marginibus magis conspicue et acute denticulata cryptostomatibus magis conspicuis numerosioribus. Folia basalia et inferiora amborum generum breviora, longitudine 20—50 mm, latitudine 4—5 (—7) mm, crypto-

stomatibus parum conspicuis, margine denticulis parcis instructa. Vesiculae sphaericae, muticae, petiolo vesiculam ipsam subaequante suffultae (fig. 2) glandulis nullis vel paucis (1—2). Receptacula mascula subdichotomo-cymosa, longa, angusta, verruculosa, inermia, evoluta usque ad 10—12 mm longa. Rami receptaculi masculi petiolo parum distincto instructi, nonnumquam omnino fertiles (fig. 1—2). Receptacula feminea verruculosa, inermia, breviora, latiora, conica, subdichotomo-cymosa densius disposita quam receptacula mascula et parcissime divisa. Rami singuli receptaculi feminei conici petiolo distincto brevi angusto teretiusculo sterili suffulti (fig. 3).

Fig. 5. *Sargassum Skottsbergii.* Weibliche Pflanze. C. 1/2.

Hab. in mare Pacifico ad Insulam Paschalem in litore saxoso loco Hanga Piko dicto.

Vorliegende *Sargassum*-Species, die hinsichtlich den übrigen Arten dieser Gattung die Gruppe *cymosum* (Ag.) J. Ag.—*Bermudense* Grun. (*lendigerum* sec. J. Ag.).—*trichocarpum* J. Ag. am nächsten kommt, ist, wie aus der Diagnose hervorgeht, dioezisch mit männlichen und weiblichen Indiwiduen unter sich nicht nur geschlechtlich, sondern auch rücksichtlich Form, Grösse und Verzweigung der Receptakeln, wie auch die Form des Blattes, die Menge und verschiedene Deutlichkeit der Cryptostomata betreffend, abweichend.

Dioezie ist von KÜTZING (Tab. phyc. X, 89, 1) für *Sarg. Horneri*, von HARVEY für *Sarg. paradoxum* angegeben. In dem grossen Sargassum-Werk von J. G. AGARDH (Species Sargassorum Australiae, K. Sv. Vet. Akad. Handl.

23 (1889)) scheint die Frage des Verhältnisses der Receptakeln in geschlechtlicher Hinsicht und damit zusammenhängende eventuelle morphologische Unterschiede ganz zur Seite gelassen zu sein. Zwar berührt GRUNOW (Additamenta ad cognitionem Sargassorum, Verh. Zool.-bot. Ges. Wien 1913—16) diese Verhältnisse hier und dort, die Angaben sind aber im Ganzen sehr unvollständig. Doch wird Dioezie für die beiden genannten und ausserdem auch für folgende fünf Arten angegeben: *S. hemiphyllum* (Turn.) Ag., *myriocystum* J. Ag., *polycystum* Ag., *Vaysieranum* (Mont.) var. *Assabiensis* Grun. und *siliquosum* J. Ag.

Die spärlichen Angaben sowohl von AGARDH, GRUNOW wie auch von anderen Verfassern diese Verhältnisse betreffend werden wahrscheinlich nur darin ihren Grund haben, dass die Untersuchungen auf trockenem, den Verfassern zugesandtem Material gegründet sind. Nach den Exsiccatenexemplaren der grossen *Sargassum*-Sammlung AGARDH's in Lund wie auch nach den zahlreichen Bildern KÜTZING's (Tab. phyc.) zu urteilen, dürften gewiss von mehreren Species vom *Sargassum* die verschiedenen Geschlechtspflanzen als getrennte Species beschrieben sein, ein Verhältnis, das ja in systematischer Hinsicht sehr lästig ist. Für eine ordentliche Aufklärung dieser Frage sind aber Untersuchungen und Studien der jeweiligen Algen draussen in der Natur eine dringende Notwendigkeit. Nur durch solche Felduntersuchungen ist eine Aufklärung dieser Sache und damit auch ein solider Grund für eine bessere Kenntnis der *Sargassum*-Gattung zu erreichen.

Die Sammlung enthält eine zweite *Sargassum*-Art. Da das Material steril ist, war eine sichere Bestimmung nicht möglich.

Lund, Bot. Laboratorium, September 1923.

11. Die Flechten der Juan Fernandez-Inseln.

Von

Dr. A. ZAHLBRUCKNER.

Mit 2 Tafeln (24—25).

Im Jahre 1835 erhielten wir die erste Nachricht über die Flechten von Juan Fernandez. C. MONTAGNE (7), damals der beste Kenner aussereuropäischer Lichenen, veröffentlichte die Liste derjenigen Arten, welche von C. I. BERTERO aufgesammelt wurden. Er zählt 49 Flechtenarten auf, darunter einige neue. In C. GAY's grossem Werke über Chile (2) wiederholt MONTAGNE diese Angaben und erweitert sie durch ergänzende. In der Beschreibung neuer Flechten, welche er hauptsächlich dem Herbare Sir WILLIAM J. HOOKER's entnahm, beschreibt TH. TAYLOR (11) auch einige wenige Arten von Juan Fernandez. Diese wurden später von MÜLLER ARG. einer Revision unterzogen (8). Nun ruhte die lichenologische Erforschung der Inselgruppe längere Zeit und erst die Challenger-Expedition brachte eine kleine Aufsammlung von Flechten mit. Das Material wurde von I. C. CROMBIE (1) bearbeitet, erschien zunächst als eigene Arbeit, welche dann dem Sammelwerk über die wissenschaftlichen Ergebnisse der genannten Expedition (10) einverleibt wurde. Im Jahre 1896 erschien F. JOHOW's Flora von Juan Fernandez. Sie enthält eine Zusammenfassung aller Angaben über Flechten und enthält auch einige neue des Verfassers. So sehr eine gute Übersicht erwünscht gewesen wäre, so kann die Zusammenfassung JOHOW's keinen Anspruch darauf erheben, eine solche zu sein. Es wurde der Aufzählung nicht eines der damals gebräuchlichen Flechtensysteme zugrunde gelegt, sondern es sind die Arten unter Beibehaltung der Nomenklatur der älteren Autoren aufgezählt. Es kommen daher dieselben Spezies unter verschiedenen Namen bei verschiedenen Gattungen vor und diese behielten eine, damals längst nicht mehr mögliche, Umgrenzung.

Die letzten Angaben in der Literatur beziehen sich auf jenes Material, welches C. SKOTTSBERG gelegentlich des Schwedischen Expedition nach Patagonien und dem Feuerland in den Jahren 1907—1909, von den Inseln mitbrachte. Nebst in diesen sich direkt auf Juan Fernandez beziehenden Arbeiten finden wir noch zerstreute Angaben in monographischen Studien (3, 4, 5) und in einer allgemeinen Flechtenflora (9).

Die Gelegenheit zu einer grosszügigen Aufsammlung auf den Inseln bot der zweite Aufenthalt C. SKOTTSBERG's daselbst. An zahlreichen Stellen der

drei Inseln sammelten Prof. und Frau SKOTTSBERG, gleichmässig an Rinden, Holz, dem oft schwer zu bearbeitenden harten Basalt, und auf dem Erdboden. Die Kollektion enthält durchwegs instruktive Stücke, die auch vielfach über die Vergesellschaftung der Arten Aufschluss geben. Die Etikettierung der Stücke ist gewissenhaft durchgeführt, sie gewährt Einblick über die vertikale und horizontale Verbreitung der Arten. Sie ist die reichste, die je dort aufgebracht wurde, und der Grundstock der vorliegenden Flora. In dieser Flora habe ich mich nicht auf die Bearbeitung des SKOTTSBERG'schen Materials beschränkt, sie soll vielmehr eine einheitliche Zusammenfassung dessen sein, was uns über die Flechtenflora der Robinsoninseln bisher bekannt geworden. Als systematische Grundlage diente meine Bearbeitung der Flechten in ENGLER-PRANTL's »Natürlichen Pflanzenfamilien» mit einer einzigen Ausnahme betreffend die Stellung der *Cyanophili* (im Sinne REINKE's), ein Vorgang, der in der zweiten Auflage des genannten Werkes näher begründet werden soll.

Insgesamt konnte bisher das Vorkommen von 186 Flechtenarten festgestellt werden, doch ist damit die Zahl durchaus nicht erschöpft. Infolge der Unmöglichkeit zur Zeit, als die Bearbeitung der Flechten erfolgte, Originalien zu erhalten, konnte ich nicht alle *Buellien* sicher bestimmen; von diesen allein kommen noch einige Arten hinzu. Ferner werden sicherlich an Mikrolichenen noch einige Entdeckungen gemacht werden können.

Nach Familien und einigen höheren Gruppen verteilen sich die 185 Arten:

Verrucariaceae	2	Arten	
Dermatocarpaceae	1	»	
Pyrenulaceae	10	»	14 Arten
Astrotheliaceae	1	»	
Sphaerophoraceae	1	»	
Arthoniaceae	4		
Graphidaceae	3	»	8 »
Chiodectonaceae	1		
Dirinaceae	1	»	
Lecanactidaceae	1		
Byssocaulon	1		
Thelotremaceae	2	»	
Diploschistaceae	2		
Gyalectaceae	3		
Coenogoniaceae	2		
Collemaceae	8		
Pannariaceae	13		
Stictaceae	18	»	45 »
Peltigeraceae	6	»	
Lecideaceae	25	»	
Phyllopsoraceae	1	»	41 »
Cladoniaceae	15	»	
Acarosporaceae	2		
Pertusariaceae	5		
Lecanoraceae	15		
Parmeliaceae	23	»	38
Caloplacaceae	10	»	
Theloschistaceae	1	»	11

Buelliaceae	5 Arten	8 Arten
Physciaceae	3 »	
Hymenolichenes	1	

Nach der systematischen Zugehörigkeit des Algenkomponenten ergibt sich folgende Gruppierung:

a.) Flechten mit Pleurococcustypus . . . . . 109 Arten, rund 60 %
b.) Flechten mit blauen Gonidien, beziehungsweise deren phylogenetische Deszendenten . . . . . 48 Arten, rund 25 %
c.) Flechten mit Trentepohliagonidien . . . . . 28 Arten, rund 15 %

Ein Vergleich dieser Zahlen mit denjenigen, welche ich für die Samoainseln gab[1], zeigt uns, dass die perzentuelle Beteiligung der Cyanophili fast dieselbe ist, dass hingegen die Arten mit Trentepohliagonidien den Archilichenen gegenüber stark abfallen. Ich glaube diesen Umstand damit begründen zu können, dass die Samoainseln ihrer geographischen Lage nach den tropischem Gebiete angehören, dessen Klima das Auftreten von Flechten mit Trentepohliagonidien begünstigt. Bemerkenswert bleibt der hohe Perzentsatz der Cyanophili, welcher eine Eigentümlichkeit vulkanischer Inzeln zu sein scheint.

An der Zusammensetzung der Flechtenflora von Juan Fernandez nehmen Teil Elemente des chilenischen Festlandes und der subantarktischen Region Amerikas, hinzu kommen dann Arten, welche im Tropicum oder Subtropicum weiter verbreitet sind, und auch Elemente der kälteren und gemässigten Gebiete, welche namentlich in den höheren Bergen Masafueras auftreten. Verhältnismässig gross ist die Zahl der Endemismen, doch ist dabei zu bedenken, dass bei einer besseren lichenologischen Erforschung der Nachbargebiete, insbesondere des chilenischen Festlandes, für manche der bisher endemisch angesehenen Arten eine weitere geographische Verbreitung festgestellt sein wird.

Die für Juan Fernandez bisher noch nicht verzeichneten Flechten sind durch ein Sternchen (*) kenntlich gemacht.

Literatur.

1. Crombie, I. C., The Lichens of the »Challenger» Expedition. — Juan Fernandez. (Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223—224.)
2. Gay, C., Historia fisica y politica de Chile. (Botan., vol. VIII, 1852, Lichenes p. 53—228.)
3. Hue, A. M., Lichenes extra-europaei a pluribus collectoribus ad Museum Parisiense missi. (Nouv. Archiv. du Muséum, ser. 3, vol. X, 1898, p. 213—280, ser. 4, vol. I, 1899, p. 27—220, tab. I—VI; ser. 4, vol. II, 1900, p. 49—122, tab. I—V et ser. 4, vol. III, 1901, p. 21—108, tab. I—VI.)
4. ——, Lichenes morphologice et anatomice descripsit. (Nouv. Archiv. du Muséum, ser. 4, vol. VIII, 1907, p. 237—272; ser. 4, vol. X, 1908, p. 169—224; ser. 5, vol. I, 1909, p. 111—166; ser. 5, vol. II, 1910, p. 1—128 et ser. 5, vol. IV, 1912, p. 1—52.)

[1] Die Flechten der Samoa-Inseln. (Denkschrift. Akad. Wiss. Wien, math.-naturw. Klasse, Band CXXXI, 1907, p. 2.)

5. Hue, A. M., Lichenum generis Crocynia Mass. plerasque species jutxa archetypa specierum morphologice et anatomice descripsit. (Mémoir. Soc. Nation. Scienc. Nat. Cherbourg, vol. XXXVII, 1909, p. 223—254.)
6. Johow, F., Estudios sobre la Flora de las Islas de Juan Fernandez. (Santjago de Chile, 1896, Lichenes p. 196—203.)
7. Montagne, C., Prodromus Florae Fernandezianae, sistens enumerationem plantarum cellularum, quas in insula Juan Fernandez a Cl. Bertero collectas describi edique curavit. (Annal. Scienc. Nat., Botan., ser. 2, vol. IV, 1835. Lichenes p. 86—94.)
8. Müller, I. (Arg.), Lichenologische Beiträge. XXVII. (Flora, vol. CXXI, 1888.)
9. Nylander, W., Synopsis methodica Lichenum (Parisiis. Vol. I, 1859—60, vol. II, 1863.)
10. Report of the Scientific Results of the Voyage of H. M. S. Challenger. Botan. vol. I (1885, Lichenes p. 19—21.)
11. Taylor, Th., New Lichens, principally from the Herbarium of Sir William I. Hooker. (London Journ. of Botan., vol. VI, 1847, p. 148—197.)
12. Zahlbruckner, A., Flechten in »Botanische Ergebnisse der Schwedischen Expedition nach Patagonien und dem Feuerland 1917—1919». (Kgl. Svensk. Vetensk.-Akad. Handl., Vol. LVII, ser. 6, 1917, p. 1—81.)

Verrucariaceae.

Verrucaria (Wigg.) A. Zahlbr.

***V. microspora** Nyl.

Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 175 et Expos. Synopt. Pyrenocarp., 1858, p. 29; A. Zahlbr., Catal. Lich. Univers., vol. I, 1921, p. 67.

Das Lager der vorliegenden Stücke ist sehr dunkel, zumeist bräunlichschwarz; die Apothezien sind zahlreich und dicht gedrängt; die Sporen 9—11 μ lang und 6—7 μ breit.

Masatierra: Bahía del Padre, auf Strandfelsen (C. und I. Skottsberg).

Microglaena Körb.

***M. fernandeziana** A. Zahlbr. nov. spec.

Thallus crustaceus, uniformis, maculas sat parvas, usque 12 mm latas formans, substratum obducens, tenuis, vix 0,2 mm crassus, sordidulenti-alutaceus, opacus, KHO et Ca Cl_2O_2 non tinctus, minute areolatus, areolis ad 0,2 mm latis, subangulosis, planis, fissuris tenuissimis separatis, in margine linea obscuriore non cinctus, sorediis et isidiis non praeditus, superne strato corticali, ex hyphis intricatis formato obductus; stratum gonidiale sat angustum, gonidiis cystococcoideis, globosis, glomeratis, laete viridibus, usque 10 μ latis; medulla alba, I—.

Apothecia dispersa, sessilia, semigloboso-obconica, ad 0,5 mm lata et totidem alta, thallo extus concoloria, vertice nigro, leviter deplanato vel modice

convexo, poro tenui pertusa; excipulum subglobosum, angustum, pallidum, moile, ex hyphis tangentialibus et conglutinatis formatum, involucrello non cinctum, extus a thallo vestitum; hymenium decolor, nec inspersum nec guttulatum, hymenogonidiis nullis, I lutescens; paraphyses persistentes, capillares, ramosae et subintricatae, eseptatae, ad apicem non latiores; asci convergentes, oblongi vel oblongo-clavati, ad apicem rotundati et ibidem membrana paulum crassiore cincti, 8 spori; sperae in ascis bi- vel subuniseriales, verticales vel obliquae, primum decolores, mox autem dilute olivaceae vel olivaceo-fumosae, denum fuscae, ovales vel ovali-ellipsoideae, crebre murali-divisae, cellulis minutis, subcubicis, 34—38 μ longae et 13—16 μ latae, halone non circumdatae, I subaurantiaco-lutescentes.

Pyenoconidia non visa.

Masatierra: Bahía del Padre, auf Strandklippen (C. und I. SKOTTSBERG).

Santa Clara: Morro de los Alelíes, auf hartem Gestein (C. und I. SKOTTSBERG).

Dermatocarpaceae.

Normandina (Nyl.) Wain.

***N. pulchella** Nyl.

NYL. in Annal. Scienc. Nat., Bot., scr. 4, vol. XV, 1861, p. 382; A. ZAHLBR., Catal. Lich. Univers., vol. I, 1921, p. 198. — *Verrucaria pulchella* Borr. apud HOOK. et SOWERB., Suppl. Engl. Bot., vol. I, 1831, tab. 2602, fig. 1.

Masatierra: Portezuelo, 400—500 m, über Flechten und Moosen, steril (C. und I. SKOTTSBERG).

Pyrenulaceae.

Arthopyrenia Mass.

Conspectus specierum:

A. Sporae persistenter biloculares.
   a. Loculi sporarum distincte inaequales *A. adnexa* var. *leptosperma.*
   b. Loculi sporarum aequales *A. cinchonae.*
B. Sporae demum 4 loculares, ad latera lyrato-incisae *A. planorbis.*

***A. cinchonae** Müll. Arg.

MÜLL. ARG. in Flora, vol. LXVI, 1883, p. 287 et in Mémoir. Soc. Phys. et Hist. Nat. Genève, vol. XXX, no. 3, 1888, p. 26; WAIN., Étud. Lich. Brésil, vol. II, 1890, p. 233; A. ZAHLBR., Catal. Lich. Univers., vol. I, 1921, p. 302. — *Verrucaria cinchonae* Ach., Synops. Lich., 1814, p. 90.

Masatierra: Cordón Salsipuedes, bei 615 m, auf *Dendroseris*-Zweigen (C. und I. SKOTTSBERG).

*A. **adnexa** Müll. Arg.

Müll. Arg. in Flora, vol. LXVI, 1883, p. 304; A. Zahlbr., Catal. Lich. Univers., vol. I, 1921, p. 312.

var. **leptosperma** A. Zahlbr. nov. var.

Sporae angustiores ut in typo brasiliensi, 20—22 μ longae et 7—9 μ latae.

Masafuera: Quebrada de la Lobería, bei 300 m, auf alter Lumaborke (C. und I. Skottsberg).

A. planorbis Müll. Arg.

Müll. Arg. in Mémoir. Soc. Phys. et Hist. Nat. Genève, voll. XXX, no. 3, 1888, p. 27; A. Zahlbr., Catal. Lich. Univers., vol. I, 1921, p. 310. — *Verrucaria planorbis* Ach., Synops. Lich., 1814, p. 92; Mont. in Annal. Scienc. Nat., Bot. ser. 2, vol. IV, 1835, p. 93.

Masatierra: Auf glatten Rinden in schattigen Bergwäldern (Bertero no. 1618).

Coccotrema Müll. Arg.

C. Cucurbitula Müll. Arg.

Müll. Arg. in Mission Scientif. Cap Horn, vol. V, 1889, p. 171; A. Zahlbr., Catal. Lich. Univers., vol. I, 1922, p. 359. — *Pertusaria Cucurbitula* Mont. apud Gay, Hist. Fisic. y Polite Chile, Botan., vol. VIII, 1852, p. 200.

var. **laevigata** A. Zahlbr.

A. Zahlbr., Catal. Lich. Univers., vol. I, 1922, p. 360. — *Pertusaria Cucurbitula* var. *laevigata* Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 160.

Auf glatten Rinden, ohne nähere Standortsangabe (Herbar. Paris).

Porina Müll. Arg.

Conspectus specierum:

A. Apothecia a thallo libera
   a. Apothecia nigra, 0,2—0,3 mm lata — *P. fernandeziana.*
   b. Apothecia rufofusca, vix 0,1 mm lata — *P. rufocarpella.*
B. Apothecia a thallo crasse obducta — *P. depressula.*

*P. **fernandeziana** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, substrato arcte adnatus, effusus, tenuis, ad 0,1 mm crassus, bene limitatus, sed linea obscuriore non cinctus, versus partem marginalem thalli tamen hinc inde lineis obscuris parce decussatus, cervinus, fere opacus, KHO —, Ca Cl_2O_2 —, continuis et inaequalis, passim,

sed rarius, valde tenuiter subareolato-rimosus, areolis minutis, sorediis et isidiis nullis; fere homoeomericus, hyphae thalli latiusculae, toruloso-inaequales et septatae, leptodermaticae, subintricatae; gonidia chroolepoidea, cellulis breviter concatenatis, rotundatis, 7—12 μ latis, contentu viridiluteo, membrana tenui cinctis.

Apothecia sat crebra, dispersa, rarius approximata, parva, 0.2—0,3 mm lata, nigra, opaca, madefacta nitidula, a thallo non vestita, plus minus convexa, semiglobosa vel etiam paulum deplanata, poro demum valde tenui pertusa; excipulum angustum, pallidum, fusco-lutescens, ex hyphis tenuissimis, tangentialibus et dense conglutinatis formatum, 35—50 μ crassum, involucrello fuligineo, semigloboso, ad basin truncato, usque ad basin excipuli producto et ibidem passim parum inflexo, arcte adhaerente obductum; nucleus conicoglobosus, ad basin plus minus deplanatus; hymenium decolor, purum, I lutescens, imprimis asci; paraphyses capillares, strictiusculae, simplices, eseptatae, ad apicem non crassiores; asci anguste rapiformes, versus apicem angustata, in ipso vertice utplurimum retusuli, recti vel leviter curvuli, 8 spori, 80—85 μ longi et 8—9 μ lati; sporae in ascis biseriales, decolores, subcylindrico-fusiformes, ad spices rotundatae, rectae, 4 loculares, ad septa valde tenuia non constrictae, membrana tenui cinctae, 22—28 μ longae et ± 3.5 μ latae.

Conceptacula pycnoconidiorum minuta, vix 0,1 mm lata, nigra, convexa; perifulerium fuligineum, dimidiatum; fulcra exobasidialia; pycnoconidia oblonga, parva 3,5—4 μ longa et ad 1 μ lata.

Masatierra: Cordón Salsipuedes, bei 465 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Gehört in den Formenkreis der *P. chlorotica* (Ach.) Müll. Arg. und unterscheidet sich von den übrigen Arten desselben durch das dickliche, glatte Lager, grössere Apothezien und schmälere Sporen.

***P. rufocarpella** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, tenuissimus, effusus, cervinus vel umbrino-cervinus, opacus, KHO —, Ca Cl_2O_2 —, continuus, laevigatus, in margine linea obscuriore non limitatus, sorediis et isidiis destitutus, fere homoeomericus, gonidiis chroolepoideis, cellulis concatenatis, rotundatis vel subirregularibus, 8—10 μ latis, contentu viridi-lutescente, membrana crassiuscula cinctis.

Apothecia dispersa, exigua, vix 0,1 mm lata, convexa vel fere semiglobosa, rufescentia, opaca, poro haud conspicuo, a thallo omnino libera; excipulum integrum, globosum, angustum et decolor, involucrello sub lente subaurantiaco, KHO rufescente, filamentoso-subcelluloso, molli, dimidiato, excipulo adhaerenti praeditum; hymenium decolor, purum, I lutescens; paraphyses capillares, liberae, simplices, eseptatae, ad apicem non latiores; asci fusiformes, recti vel curvuli, ad apicem angustati et in ipso apice rotundato-retusi, 75—78 μ longi et 8—10 μ lati, 8 spori; sporae in ascis biseriales, decolores, oblongo-fusiformes vel oblongo-dactyloideae, rectae, triseptatae, cellulis aequalibus, septis tenuibus, membrana tenui cinctae, 19—22 μ longae et ± 3,5 μ latae.

Pycnoconidia non visa.

Masatierra: Cordón Salsipuedes, 465 m, auf einem etwas überhängenden vulkanischen Block (C. und I. SKOTTSBERG).

Habituell der vorigen, mit ihr an demselben Standort lebenden Art sehr ähnlich, aber mit ihr durch die kleinen, nicht schwarzen Apothezien nicht zu verwechseln. Ähnliche Convergenzerscheinungen lassen sich auch bei anderen Gattungen (z. B. *Buellia*) auf Juan Fernandez beobachten.

***P. depressula** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, subtartareus, tenuis, 0,12—0,18 μ. crassus, argillaceo-cinerascens, madefactus argillaceus, opacus, KHO sanguineo-sordidescens, Ca Cl_2O_2 non tinctus, effusus, subcontinuus vel irregulariter, minute et tenuiter rimulosus, parum inaequalis, sorediis et isidiis nullis praeditus, linea obscuriore non cinctus, superne strato corticali tenui, subdecolore, ex hyphis intricatis formato obductus, caeterum fere homoeomericus; gonidia chroolepoidea, crebra.

Apothecia verruciformia, dispersa vel approximata, sessilia, placentiformia, ad basin bene constricta, ad verticem deplanata, sessilia, thallo concolora, usque 1 mm lata, a thallo crassiuscule cincta (ibidem KHO sanguinea), in parte verticali excipuli partem apicalem e plano convexam, sordide fuscescentem et ± pruinosulam, madefactam rufam vel rufo-nigricantem, usque 0,5 mm latam denudentia; excipulum integrum, inferne paulum angustius, rufescenti-ochraceum vel rufescenti-lutescens, KHO rufescens, circa ostiolun plus minus nigricans, ex hyphis tangentialibus, tenuibus et dense contextis formatum, globosum, superne in collum breve, sat abrupte angustatatum abiens; hymenium decolor, purum, I vix lutescens; paraphyses capillares, densae, strictae, liberae, simplices, esceptatae, ad apicem non latiores; periphyses filiformes, tenuies, densae, strictae, collum intus obducentes; asci convergentes, oblongo- vel subcylindrico-clavati, rectiusculi, ad apicem rotundati et membrana passim bene incressata cincti, 8 spori; sporae in ascis biseriales, rarius subuniseriales, decolores, fusiformes vel dactyloideo-fusiformes, utrinque acutatae, rectae vel subrectae, 10—12 loculares, septis tenuibus et membrana tenui, 52—64 μ. longae et 7,5—9 μ. latae.

Pycnoconidia ignota.

Masatierra: Quebrada Monte Maderugo, 390 m, auf einer Felswand (C. et I. SKOTTSBERG).

Masafuera: Quebrada de las Casas, auf einer feuchten, schattigen Felswand (C. und I. SKOTTSBERG).

Was die äussere Erscheinung betrifft, so herrscht zwischen der obigen Art und der in Brasilien vorkommenden *Porina exserta* Müll. Arg. eine gewisse Übereinstimmung, es ist mir wahrscheinlich, dass beide Arten in verwandtschaftlicher Beziehung stehen. Indes ist die Gestaltung der Fruchtwarzen und der Sporen nicht in Einklang zu bringen.

Pyrenula Ach.

Conspectus specierum:

A. Apothecia extus a thallo obducta et tautum vertice libera
P. aspistea.

B. Apothecia nuda, nigra
a. Sporae 16—18 × 6—8 μ. *P. mamillana.*
b. Sporae 19—23 × 8—11 μ. *P. Kunthii.*

P. aspistea Ach.

Ach. in Gesellsch. Naturf. Freund. Berlin. Magazin, vol. VI, 1814, p. 17, tab. II, fig. 8; A. Zahlbr., Catal. Lich. Univers., vol. I, 1922, p. 423. — *Verrucaria aspistea* Afz. apud Ach., Method. Lich., 1803, p. 121; Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93.

Masatierra: Auf Baumrinden, ohne nähere Standortsangabe (Bertero no. 411); Cordón Salsipuedes, auf *Drimys*-Zweigen (C. und I. Skottsberg).

***P. mamillana** Trevis.

Trevis., Conspect. Verruc., 1860, p. 13; A. Zahlbr., Catal. Lich. Univers., vol. I, 1922, p. 436. — *Verrucaria mamillana* Ach., Method. Lich., 1803, p. 279.

Masatierra: Cordón Chifladores, 350 m, auf Zweigen der *Robinsonia thurifera;* am Fusse eines Abhanges von El Yunque, bei 400 m, auf *Myrceugenia*-Zweigen; Portezuelo, bei 600 m, auf Stämmen der *Robinsonia thurifera;* Quebrada seca, 435 m, auf *Dendroseris*-Rinde; Cordón Salsipuedes, 615 m, auf *Dendroseris*-Rinde (C. et I. Skottsberg).

***P. Kunthii** Fée.

Fée, Suppl. Essai Crypt. Écorc. Offic., 1837, p. 80, tab. XLI, fig. 18; A. Zahlbr., Catal. Lich. Univers., vol. I, 1922, p. 434. — *Verrucaria Kunthii* Fée, Essai Crypt. Écorc. Offic., 1824, p. 88, tab. XXXIV, fig. 4.

Masatierra: Cordón Chifladores, auf *Myrceugenia*-Rinde; Portezuelo, beim Selkirk-Denkmal 590 m, auf *Berberis*-Zweigen (C. et I. Skottsberg).
Masafuera: Quebrada del Mono, auf der Rinde der *Myrceugenia Schulzei* (C. et I. Skottsberg).

Astrotheliaceae.

Pyrenastrum Eschw.

P. chilense Mont.

Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 204; Johow, Estud. Flor. Juan Fernand., 1896, p. 201. — *Pyrenastrum americanum* Mont. in Annal. Scienc. Nat., ser. 2, vol. IV, 1835, p. 94 (non Sprgl.).

Masatierra: auf *Fagara*-Rinde, ohne nähere Standortsangabe (Bertero no. 1622).

Sphaerophoraceae.

Sphaerophorus Pers.

S. melanocarpus DC.

DC. apud LAM. et DC., Flor. Franç., edit. 2, vol. VI, 1805, p. 178; A. ZAHLBR., Catal. Lich. Univers., vol. I, 1922, p. 693. — *Lichen melanocarpus* Sw., Nova Gener. et Spec. Plant., 1788, p. 147. — *Sphaerophoron comspressum* Ach., Method. Lich., 1803, p. 135.

Masatierra: Auf Baumstämmen, ohne nähere Standortsangabe (BERTERO), auf dem Rücken zwischen Quebrada Piedra agujereada und Quebrada Laura, 625 m, am Fusse eines *Drimys* Stammes; Portezuelo, bei 500 m, auf Baumstämmen; Felskamm unw. Tres Puntas, 300–350 m (C. et I. SKOTTSBERG).

Masafuera: Las Torres, bei 1,200 m; Los Inocentes, südöstliche Abhänge, 950 m, im *Drimys*-Wald, am Fuss der Baumstämme (C. et I. SKOTTSBERG).

Arthoniaceae.

Arthonia Ach.

Conspectus specierum:

A. Apothecia lirellina, elongata.
   a. Sporae biloculares; loculi sporarum subaequales *A. cytisi* var. *meridionalis.*
   b. Sporae triloculares; loculorum apicalis loculis reliquis latior et major
      I. Sporae 11—15 μ longae et 4—6 μ latae *A. subnebulosa.*
      II. Sporae 15—17 μ longae et 5—6 μ latae *A. berberina.*

B. Apotheria rotundata vel angulosa; sporae 4—6 loculares, loculus sporarum supremus maximus *A. complanata.*

***A. cytisi** Mass. — Taf. 24, Fig. 1.

MASS. in Nuov. Annal. Sc. Nat. Bologna, vol. VII, 1835, p. 216; A. ZAHLBR., Catal. Lich. Univ., vol. II, 1922, p. 36. — *Arthonia excipienda* Nyl., Lich. Scandin, 1861, p. 261.

var **meridionalis** A. Zahlbr. nov. var. — Taf. 24, Fig. 3—4.

Lirellae tenuiores et praesertim magis ramosae et plus minus radiatae. Caeterum cum planta europaea congruens.

Masatierra: Portezuelo de Villagra, 590 m, auf den Zweigen der *Berberis corymbosa* (C. et I. SKOTTSBERG).

***A. subnebulosa** A. Zahlbr. nov. spec.

Thallus epiphloeodes, tenuissimus, substratum arcte obducens, effusus, in margine late ochraceo lutescens et nitidulus, in parte centrali magis albescens,

subnitidus vel fere opacus, KHO —, Ca Cl_2O_2 —, laevigatus, continuus, in ambitu linea tenui et nigricante cinctus, molliusculus, sorediis et isidiis destitutus, homoeomericus; gonidia chroolepoidea, cellulis concatenatis, plus minus rotundatis, 6—10 μ latis, contentu dilute viridi-lutescente impletis.

Apothecia sessilia, depressa, maculiformi-substellata, ramis brevibus, ut plurimum confluentibus, 1—1,3 mm latis et paulum longioribus, obscure fusca, epruinosa, emarginata, demum elabentia; hymenium angustum, superne rufo-fuscum et KHO paulum in olivaceum vergens, caeterum decolor et purum, I cupreum; hypothecium decolor; paraphyses tenues, eseptatae, intricatae; asci pyriformi-subglobosae, ad basin abrupte cuneati, 28—30 μ longi et 18—20 μ lati, 8 spori; sporae in ascis 3—4 seriales, ex incolore mox fuscidulae et demum fusco-obscuratae, solaeformes, rectae vel curvulae, triloculares, loculus apicalis reliquis latior et major, membrana tenui cinctae, 11—15 μ longae et 4—6 μ latae.

Pycnoconidia non visa.

Masatierra: Quebrada Gutierrez, auf *Juania*-Rinde (C. et I. SKOTTSBERG).

Die neue Art gehört zu jenen Arthonien, welche konstant dreizellige Sporen besitzen. Die Sporen der bisher bekannten Arten dieses Formenkreises sind durchwegs grösser. Benachbarte Arten dürften *Arthonia ephelodes* Nyl. und *Arthonia scitula* Krph. sein.

***A. berberina** A. Zahlbr. nov. spec. — Taf. 24, Fig. 2.

Thallus epiphloeodes, tenuis, uniformis, flavido-albescens, nitidulus et laevigatus, circa apothecia albidior, opacus et leviter verruculoso-inaequalis, KHO —, Ca Cl_2O_2 —, effusus, continuus, sorediis et isidiis destitutus, in margine passim linea nigricante et tenui cinctus; gonidia chroolepoidea.

Apothecia sessilia, immarginata, fusco-nigricantia, epruinosa, madefacte plus minus in sanguineo-fuscum vergentia, irregulariter stellato-radiata, ramis sat brevibus, angustis, ad apicem rotundatis vel retusatis, convexiusculis, usque 1 mm longis; hymenium superne rufo-fuscum, KHO nigricans, non inspersum, caeterum decolor, purum, 70—80 μ altum, I e coeruleo cupreo-sordidescens; hypothecium tenue, pallidum, flavescens, molle, ex hyphis intricatis formatum; paraphyses tenuies, ramosae et intricatae, parum distinctae, eseptatae; asci late pyriformes, ovali- vel subgloboso-clavati, ad apicem rotundati et membrana crassa cincti, 40—48 μ longi et 16—18 μ lati, 8 spori; sporae in ascis triseriales, decolores, ellipsoideae vel oblongo-subcuneatae, utrinque rotundatae, rectae, triseptatae, loculus apicalis reliquis multum major et paulum latior, septis tenuibus, ad septa non constrictae, 15—17 μ longae et 5—6 μ latae, I cupreae.

Conceptacula pycnoconidiorum minuta, punctiformia, vertice nigro, vix prominulo; perifulcrium dimidiatum, sub lente obscure fuscum; fulcra exobasidialia; pycnoconidia bacillaria, recta vel subrecta, 3,5—4 μ longa at ad 0,6 μ lata.

Masatierra: Portezuelo, beim SELKIRK-Denkmal, 590 m, auf *Berberis*-Zweiglein (C. et I. SKOTTSBERG).

Die Art gehört in den Artenkreis der *Arthonia varia* (Ach.) Nyl. und

weicht durch die Gesamtheit der Merkmale von den übrigen Gliedern der Gruppe ab.

*A. complanata Fée.

Fée, Essai Crypt. Écorc. Officin., 1824, p. 54; A. Zahlbr., Catal. Lich. Univers., vol. II, 1922, p. 32

Masatierra: Cordón Salsipuedes, auf *Drimys*-Zweigen (C. und I. Skottsberg).

Graphidaceae.

Graphis (Adans.) Ach.

*G. intricata Fée.

Fée, Essai Crypt. Écorc. Officin., 1824, p. 42, tab. IX, fig. 3; A. Zahlbr.' Catal. Lich. Univ., vol. II, 1923, p. 313.

Masatierra: Quebrada seca, 435 m, auf *Fagara*-Rinde (C. und I. Skottsberg).

Die Stücke von Juan Fernandez zeigen nur seltener sternförmige Lirellen, diese sind zumeist einfach oder spärlich verzweigt, doch bildet Fée auch solche ab. Die Sporen fand ich 8—9-zellig, 36—40 μ lang und 8,5—9 μ breit. Das Excipulum ist kohlig, geschlossen, am Grunde abgestutzt und nur etwas dicker; die Lippen sind zugespitzt und neigen gegen einander.

*G. Dumastii Sprgl.

Sprgl., Syst. Veget., vol. IV, pars 1, 1827, p. 254; A. Zahlbr, Catal. Lich. Univers., vol. II, 1923, p. 302. — *Fissurina Dumastii* Fée, Essai Crypt. Écorc. Officin., 1824, p. XC, tab. I, fig. 7 et p. 59, tab. XVI, fig. 4.

Masatierra: Quebrada seca, 435 m, auf der Rinde der *Dendroseris micrantha* (C. und I. Skottsberg).

Lirellae labiis thallinis integris, superne conniventibus, strato corticali angusto, 12—16 μ crasso, decolore, subchondroideo, ex hyphis dense conglutinatis longitudinalibus formato obductae, gonidia pauca et medullam subcineream includentes; excipulum rudimentarium, anguste flabellatum, sordide fuscidulum, parti superiori hymenii adnatum; hypothecium valde angustum, decolor; hymenium decolor, purum, superne non obscuratum, I vix lutescens; paraphyses strictae, filiformes, contextae, simplices, eseptatae; asci anguste clavati, 8 spori; sporae in ascis subuniseriales, decolores, late ellipsoideae, apicibus obtuse rotundatis, rectae, 4 loculares, loculis lentiformibus, 21—24 μ longae et 10—13 μ latae, I pallide aurantiaco-cupreae.

Montagne gibt für Masatierra als auf Rinden lebend noch *Graphis scripta* (L.) Ach. an. Mir ist diese Flechte in der Skottsberg'schen Aufsammlung

nicht aufgefallen. Ich halte ihr Vorkommen nicht für wahrscheinlich, obwohl sie auch für Chili angegeben wird. Die älteren Angaben dieser Flechte beziehen sich vielfach auf andere Arten der Gattung *Graphis*.

Phaeographina Müll. Arg.

P. scalpturata Müll. Arg.

Müll. Arg. in Flora, vol. LXV, 1882, p. 399 et in Mémoir. Soc. Phys. et Hist. Nat. Genève, vol. XXIX, no. 8, 1887, p. 48; A. Zahlbr. in Sitzungsber. Akad. Wiss. Wien, math.-naturw. Kl., vol. CXI, Abt. 1, 1902, p. 388, tab. II, fig. 15—16. — *Graphis scalpturata* Ach., Synops. Lich., 1814, p. 86; Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93.

Masatierra: Auf Baumrinden, ohne nähere Standortsangabe (Bertero no. 1612).

Ich fand diese in den subtropischen und tropischen Regionen lebende Flechte in der Skottsberg'schen Aufsammlung nicht. Die Angabe wäre zu überprüfen.

Chiodectonaceae.

Enterostigma.

E. Skottsbergii A. Zahlbr.

A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 9.

Masafuera: auf dem Hochplateau, 1,100—1,200 m, auf Lava (C. et I. Skottsberg).

Dirinaceae.

Dirina Fr.

***D. limitata** Nyl.

Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 158.

Masatierra: Bahía del Padre, auf Strandfelsen (C. et I. Skottsberg).

Lecanactidaceae.

Schismatomma Fw. et Körb.

***S. accedens** A. Zahlbr. nov. comb.

Lecidea accedens Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 163 et vol. XI, 1869, p. 225, not. — *Toninia accedens* A. Zahlbr. in Beiheft. zum Bot. Centralbl., vol. XIX, 2. Abt., 1905, p. 77.

Thallus epilithicus, crassiusculus, bullatus, bullato-verrucosus vel subcerebrinus, verrucae ad ambitum thalli subdispersae, mox autem confluentes et thallum expansum formantes, rufescenti-fuscescens vel badius, rarius primum testaceo-fuscescens, fere opacus, KHO —, Ca Cl_2O_2 —, in superficie laevigatus vel toruloso-subplicatus, subtus niger vel nigrescens, sorediis et isidiis nullis, hypothallo nigricante, ex hyphis formato laxiuscule retiformi-contextis, fuscis vel nigricantibus, usque 3,5 μ crassis, ramosis; superne et ad latere verrucarum distincte, subtus minus distincte corticatus; cortex ad ambitum rufo-fuscus, caeterum decolor, chondroideus, 44—90 μ crassus, ex hyphis intricatis et dense contextis formatur, non inspersus; medulla crassa, solida, tartarea, alba vel dilute flavescenti-albida, KHO, Ca Cl_2O_2 et KHO + Ca Cl_2O_2 non tingitur, I lutescit, ex hyphis inspersis, intricatis, ad 2 μ crassis, sat leptodermaticitis formata; stratum gonidiale infra corticem superiorem situm, continuum, gonidiis chroolepoideis, cellulis rotundatis vel irregularibus, increbre concatenatis, contentu pallide viridescente, membrana tenui cinctis, 8—16 μ longis.

Apothecia e verrucis erumpentia, mox alte sessilia vel subpodicellata, dispersa, lecanorina, rotunda vel rotundata, demum sinuoso-flexuosa, ad basin bene constricta, usque 2 5 mm lata; receptaculum extus laevigatum, corticatum, medullam sat amplam et gonidia includens; discus dense caesio-pruinosus, albus, opacus, KHO —, Ca Cl_2O_2 —, planus vel convexiusculus, demum (ut videtur morbose) pruina destitutus et niger; margo tenuis, integer vel subinteger, thallo concolor vel paulum pallidior, leviter prominulus, persistens; hypothecium obscure rufo-fuscum vel nigricans, ad latera sat tenue, infra hymenium crassiusculum, ex hyphis plus minus perpendicularibus, versus hymenium non bene limitatis et passim in cum penetrantibus formatum; hymenium superne crassiuscule pulverulento-inspersum, sordidum, caeterum fere decolor vel dilute fuscescens, spumoso-inspersum, 170—190 μ altum, I vinose cupreum vel pro parte aeruginoso-obscuratum; paraphyses filiformes, 1,5—1,8 μ crassae, leviter flexuosae, ramosae et subintricatim connexae, eseptatae, ad apicem non latiores; asci hymenio subaequilongi, facile liberi, clavati, ad basin caudato angustati, ad apicem rotundati et membrana incrassata cincti, 8 spori; sporae in ascis biseriales, subdigitiformes, ellipsoideo-oblongae vel oblongo-fusiformes, utrinque rotundati, rectae, triseptatae, septis tenuibus, 20—25 μ longae et 5,5—8 μ latae.

Pycnoconidia non visa.

Masatierra: Cordón Salsipuedes (C. und I. SKOTTSBERG).

Ohne ein Urstück der NYLANDER'schen Art gesehen zu haben, bin ich bei den augenfälligen habituellen Merkmalen dieser Flechte sicher, sie richtig gedeutet zu haben. NYLANDER stellte die Flechte zu den *Toninien,* in welcher Auffassung ich ihm früher folgte, da ich keine Gelegenheit hatte, sie näher zu studieren. Übrigens sagt NYLANDER selbst, dass er seine Beschreibung nach einem kümmerlichen Exemplar entwarf, sonst wäre ihm der Gonidientypus sicherlich nicht fremd geblieben. Von den Paraphysen wird ferner gesagt, dass sie »graciles» wären, was die Frage, ob in einfach oder verzweigt, einfach, wie bei *Toninia,* oder verästelt und mehr weniger netzartig-verbunden, wir bei *Schismatomma* seien, offen lässt. Auch das bei den *Schismatommen* und *Lecanactis*-Arten so oft zu beobachtende leichte Loslösen der Schläuche von

den Paraphysen wird nicht erwähnt. Alle diese Merkmale aber sind für die generische Einreihung der Flechte massgebend.

Habituell ähnlich ist die ebenfalls auf Juan Fernandez vorkommende *Toninia bullata*, sie kann aber mit dieser Flechte wegen des glänzenden Thallus und der schwarzen Apothezien schon äusserlich nicht verwechselt werden; bei mikroskopischer Untersuchung treten die trennenden Merkmale noch mehr hervor.

[Chrysothricaceae.

Chrysothrix noli tangere Mont. in Annal. Scienc. Nat., Bot., ser. 3, vol. XVIII, 1852, p. 313 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 213; Mass. in I. R. Istit. Veneto, ser. 3, vol. V, 1860, p. 499, tab. III; Senft in Ber. Deutsch. Bot. Gesellsch., vol. XXXIV, 1916, p. 592, tab. XVII. — *Cilicia noli tangere* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. II, 1834, p. 375, tab. XVI, fig. 2 et vol. IV, 1835, p. 94.

Zweifelhaft. Montagne schreibt, Prodr., 1835 p. 94: Crescit ad ramulos arborum et in *Usnea ceratina:* Sterilis lecta. Specimina chilensia sola fructifera vidi. — Bertero coll. n. 176. — In Annal. 1834 werden nur Bertero's Exemplare aus Chile erwähnt: diese sind fertil, die insulären sollen aber steril sein. Wahrscheinlich stammen aber auch die sterilen Stücke aus Chile, jedenfalls die auf *Usnea* wachsenden, aber wohl auch die anderen. Näheres bei *Ramalina* und *Usnea*.]

Byssocaulon Mont.

B. niveum Mont. — Taf. 25, Fig. 2.

Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. III, 1835, p. 355; Born. in Annal. Scienc. Nat., Bot., ser. 5, vol. XVII, 1873, p. 60, tab. VII, fig. 5; Bonnier in Journ. de Bot., vol. I, 1887, p. 3, fig. 6; Nyl., Lich. Japon., 1890. p. 59. — *Parmelia gossypina* var. *filamentosa* Mont. in Annal. Scienc. Nat., Bot., ser. 3, vol. XVI, 1851, p. 50 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 144; Johow, Estud. Flor. Juan Fernandez, 1896, p. 201. — *Byssocaulon filamentosum* Nyl. in Mémoir. Soc. Scienc. Natur. Cherbourg, vol. V, 1857, p. 119. — *Crocynia nivea* Hue in Mémoir. Soc. Nation. Scienc. Natur. Cherbourg, vol. XXXVII, 1909, p. 244.

Masatierra: auf Baumrinden in schattigen Wäldern der höchsten Berge (Bertero); Cordón Central, 500 m, auf feuchten Felsen über verwitterten Moosen (C. und I. Skottsberg); Pangal, bei 600 m, über Moosen (C. und I. Skottsberg); am Wege bei Portezuelo, auf Baumrinden (C. und I. Skottsberg).

Thelotremaceae.

Ocellularia Sprgl.

***O.** (sect. *Ascidium*) **subdenticulata** A. Zahlbr. nov. spec. — Taf. 24, Fig. 6.

Thallus substratum obducens, tenuis, submembranaceus, albus, opacus, KHO —, Ca Cl_2O_2 —, continuus, plus minus aequalis, sorediis et isidiis destitutus, haud bene limitatus et linea obscuriore non cinctus.

Apothecia dispersa vel approximata, sessilia, depresso-subglobosa, ad basin distincte constricta, 0,6—0,8 mm lata et fere totidem alta; discus immersus, pallide fusco-rufescenticarneus, opacus, epruinosus, angustus et demum hymenio elapso dilatatus; receptaculum rufescenti-albidum, circa discum album, marginem annulatum, demum crenulatum vel subdenticulatum formans; excipulum duplex, interius decolor, angustum, ex hyphis tangentialibus, tenuibus et dense conglutinatis formatum, exterius sat crassum, obscure rufofuscum, KHO sanguineo-rufescens; hymenium decolor, purum, I lutescens, non columellatum; paraphyses capillares, densae, strictae, simplices, eseptatae, ad apicem non latiores; asci saccato-clavati, recti, ad apicem rotundati et membrana incrassata cincti, 4—8 spori, I cuprei; sporae in ascis 2—3 seriales, decolores, fusiformes, plus minus vermiculares, 16—20 loculares, loculis depresso-lentiformibus, centralibus reliquis paulum latioribus, 50—80 μ longae et 7—9 μ latae, I violascentes.

Pycnoconidia non visa.

Masafuera: Nördlicher Teil der hohen Kammes, auf bemoosten *Dicksonia*-Stämmen (C. und I. SKOTTSBERG).

Thelotrema (Ach.) Müll. Arg.

***T. lepadinum** Ach.

Masatierra: Cordón Chifladores, auf Baumrinden (C. et I. SKOTTSBERG); Quebrada Gutierrez, auf *Juania*-Rinde (C. et I. SKOTTSBERG); Quebrada seca, 435 m, auf der Rinde von *Coprosma* und *Fagara* (C. et I. SKOTTSBERG).

Masafuera: Quebrada de la Lobería, im Walde auf *Luma*-Rinde, 800 m (C. et I. SKOTTSBERG).

Stimmt mit der europäischen Pflanze völlig überein. Auf diese Flechte dürfte sich jenes *Thelostrema* beziehen, welche CROMBIE (Journ. Linn. Soc. London, Bot., vol. XVI, p. 223) ohne nähere Bestimmung der Art für Juan Fernandez angibt.

Diploschistaceae.

Diphloschistes Norm.

A. Apothecia pyrenocarpoidea, disco minuto et margine radiato-plicato; thallus KHO *D. actinostomus.*

B. Apothecia lecanorina, disco lato; thallus KHO lutescens *D. scruposus* var. *arenarius.*

D. actinostomus A. Zahlbr.

A. ZAHLBR. in Hedwigia, vol. XXXI, 1892, p. 34; A. L. SMITH, Monogr. Brit. Lich., vol. I, 1918, p. 384; WAIN. in Acta Acad. Scient. Fennic., ser. A, vol. VI, no. 7, 1915, p. 132. — *Urceolaria actinostoma* Pers. apud ACH., Lichenogr. Univ., 1810, p. 288. — *Verrucaria actinostoma* Ach., Lichenogr. Univ., 1810, p. 288; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93.

Masatierra: Auf Felsen in den Bergen (BERTERO no. 374).

D. scruposus Norm.

Norm. in Nyt Magaz. for Naturv., vol. VII, 1853, p. 232. — *Urceolaria scruposa* Ach., Method. Lich., 1803, p. 147; Cromb. in Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223; Johow, Estud. Flor. Juan Fernandez, 1896, p. 200.

Masatierra: ohne nähere Standortsangabe (Moseley).

var. **arenarius** Müll. Arg.

Müll. Arg. in Hedwigia, vol. XXXIII, 1892, p. 196; Stnr. in Verhandl. zool.-bot. Gesellsch. Wien, vol. LXI, 1911, p. 45. — *Urceolaria scruposa* var. *arenaria* Schaer., Lich. Helvet. Spicil., sect. 2, 1826, p. 75.

Masatierra: Puerto Frances, auf der Erde (C. und I. Skottsberg); Cordón Centinela, auf losem Tuff (C. und I. Skottsberg); Strandgebiet zwischen der Kolonie und Pangal, auf der Erde (C. und I. Skottsberg).

Gyalectaceae.

Microphiale (Stzbg.) A. Zahlbr.

***M. lutea** A. Zahlbr.

A. Zahlbr. in Sitzungsber. K. Akad. Wiss. Wien, math.-naturw. Classe, vol. CXI, 1. Abt., 1902, p. 393. — *Lichen luteus* Dicks., Fasc. Plant. Crypt. Brit., vol. I, 1785, p. 11, tab. II, fig. 6.

Receptaculum crassiuscule corticatum, cortice chondroideo, extus anguste ochraceo-flavescente, intus hyalino, ex hyphis radiantibus, tenuibus et intricatis formato, medullam et gonidia increbra, in parte inferiore sita includente; hypothecium lutescens, molle, ex hyphis intricatis formatur; hymenium superne anguste dilute sordidescens, caeterum decolor et purum, 70—80 μ altum, I e coeruleo aeruginoso-sordidulum; paraphyses strictae, filiformes, simplices, eseptatae, ad apicem non latiores; asci oblongo-clavati, hymenio subaequilongi, ad apicem angustato rotundati et membrana vix crassiore praediti, 8 spori; sporae in ascis plus minus biseriales, decolores, fusiformi-oblongae, ad apices rotundatae, rectae, uniseptatae, septo et membrana tenui, cellulis acqualibus, 10—13 μ longae et 3,5—4 μ latae.

Masatierra: auf dem Rücken oberhalb Pangal, 400 m, auf *Coprosma pyrifolium* und Quebrada seca, 435 m, auf *Coprosma triflorum* (C. und I. Skottsberg).

Masafuera: Quebrada del Mono, 475 m, auf *Myrceugenia Schulzei* (C. und I. Skottsberg).

Gyalecta Ach.

***G. jenensis** A. Zahlbr. nov. comb.

Lichen jenensis Batsch, Elench. Fungor., Cent. prima, 1786, p. 219, fig. 153. — *Lichen cupularis* Hedw., Descript. et Adumbr. Muscor. Frondos., vol. II, 1789,

p. 58, tab. XX, fig. B. — *Gyalecta cupularis* Schaer., Lich. Helvet. Spicil., sect. 2, 1826, p. 79.

Masatierra: Bahía del Padre, auf Strandklippen und auf der Steilwand südlich von Tres Puntas, 380 m (C. und I. SKOTTSBERG).

Pachyphiale Lönnr.

P. cornea Poetsch et Schiederm.

POETSCH und SCHIEDERM., Aufzähl. samenl. Pflanzen., 1872, p. 222. — *Lichen corneus* With., A Botan. Arrang. Brit. Plants, vol. II, 1776, p. 712. — *Lecidea carneola* Ach., Lichenogr. Univ., 1810, p. 194, tab. II, fig. 7. — *Biatora carneola* Fr. in Kgl. Vetensk.-Akad. Nya Handl., 1822, p. 267; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 174; JOHOW, Estud. Flora Juan Fernandez, 1896, p. 201.

Masatierra: auf Baumrinden (BERTERO no. 29).

Unter den von SKOTTSBERG gesammelten Flechten fand ich diese Art nicht.

Coenogoniaceae.

Coenogonium Ehrbg.

***C. velutinum** A. Zahlbr. nov. spec.

Thallus glauco-cinerascens, opacus, substrato omnius adnotus, aequaliter velutino-pannosus, pulvinulos deplanatos, rotundatos, usque 4 cm latos et demum plus minus confluentes, caeterum bene limitatos formans; filamenta 7,5—9,5 μ crassa, septata, cellulis cylindricis, 18—25 μ longis, ad septa non constrictis, membrana et septo mediocri cinctis, increbre ramosa, extus hyphis verticalibus.

Apothecia biatorina, sessilia, dispersa vel approximata, usque 1,2 mm lata, ceraceo aurantiaca, epruinosa, e concaviusculo subplana vel vix convexa; margo disco pallidior, albidellus, tenuis, integer, persistens; excipulum integrum ad latera hymenii angustius quam infra hypothecium, ex hyphis radiantibus, dense conglutinatis et crebre septatis formatum, paraplectenchymaticum, I dilute coerulescens; hypothecium pallidum, flavescens, ex hyphis valde tenuibus et intricatis contextum; hymenium fere decolor, tantum superne dilute flavens, purum, 100—110 μ altum, I e coeruleo mox rufescenti-obscuratum; paraphyses graciles, strictae, simplices, eseptatae, ad apicem haud latiores; asci copiosi, angusti, subcylindrici et paulum clavati, hymenio subaequilongi, 8 spori; sporae in ascis subuniseriales, decolores, ellipsoideae vel ellipsoideo-fusiformes, versus apices angustatae, uniseptatae, membrana et septo tenui, ad septa non constrictae, rectae, 9,5—11 μ longae et 3—3,5 μ longae.

Pycnoconidia non visa.

Masatierra: an den südlichen Abhängen des El Yunque, 500 m, auf *Drimys*-Stämmen (C. und I. SKOTTSBERG).

Die Lagerfäden, Gestalt und Grösse der Sporen sind wie bei *Coenogonium complexum* Nyl., aber die Paraphysenende sind nie kopfförmig, ausserdem ist das Lager gleichmässig ausgebreitet und trägt keine zottigen Büschel.

Racodium Fr.

R. rupestre Pers.

Cystocoleus rupestris Thw.; Johow, Estud. Flora Juan Fernand., 1896, p. 203.

Masatierra: ohne näheren Standort, auf vulkanischem Gestein (Johow.)

Collemaceae.

Lemmopsis (Wain.) A. Zahlbr.

*__L. polychidioides__ A. Zahlbr. nov. spec. — Taf. 25, Fig. 7.

Thallus minute filamentose et irregulariter ramosus, ramis densis, filiformibus, cylindricis, vix 0,1 mm latis, sat brevibus, decumbentibus, rigidiusculis et implexis, luride fuscescentibus, madefactis obscurioribus, homoeomericus, omnim paraplectenchymaticus, cellulis marginalibus angulosis, internis magis rotundatis, omnibus valde leptodermaticis, 6—11 μ latis, ad ambitum thalli extus strato tenui, amorpho, lutescente passim tectis; gonidia nostocacea, concatenata, catenis ut plurimum abbreviatis, cellulis rotundis, 5—6 μ latis.

Apothecia biatorina, sessilia, 1—1,5 mm lata, rufa, opaca, e concaviusculo demum convexa; margo disco paulum dilutior, tenuis, integer; receptaculum ex hyphis radiantibus, septatis (cellulis cylindricis) et leptodermaticis formatum; excipulum dimidiatum, tantum ad latera hymenii evolutum et leviter infra hymenium productum, ex hyphis tangentialibus, tenuibus, dense contextis compositum; hypothecium sat crassum, fere hymenio subaequilatum, subdecolor (pallide lutescens), ex hyphis intricatis formatum; hymenium superne anguste rufofuscum, caeterum decolor et purum, 100—110 μ altum, I e coeruleo cupreoluridum; paraphyses filiformes, conglutinatae, simplices, eseptatae, ad apicem clavatae; asci cylindrico-clavati, hymenio subaequilongi, ad apicem rotundati et membrana modice incrassata cincti, 8 spori; sporae in ascis uni- vel subbiseriales, simplices, decolores, ovales vel late ellipsoideae, utrinque acutatae, membrana tenui cinctae, 12—15 μ longae et 7,5—8 μ latae.

Pycnoconidia ignota.

Masatierra: Cordón Chifladores, auf morschen Baumzweigen (C. und I. Skottsberg).

Im Habitus gleicht die neue Art sehr dem *Polychidium muscicolum*, nur die Apothezien sind heller und zeigen das Rotbraun der *Pannaria*-Apothezien. Das Lager ist anatomisch gebaut wie die Arten der Sekzion *Homodium* der Gattung *Leptogium*. *Lemmopsis Arnuldiana* (Hepp) A. Zahlbr. besitzt eine obere und untere Rinde aus eckigen Zellen gebildet, das Innere ist homoemerisch, wie bei *Collema;* diese Art entspricht demnach in ihrem anatomische Bau der Sekzion *Euleptogium*. Somit sehen wir derzeit bei *Lemmopsis* zwei anato-

mische Typen inbezug des Lagers und es lassen sich darauf in analoger Weise zwei Sektionen: *Eulemmopsis* A. Zahlbr. nov. sect. und *Homodiopsis* A. Zahlbr. nov. sect. begründen.

Physma Mass.

*__P. chilense__ Hue. — Taf. 25, Fig. 4.

Hue in Bull. Soc. Linn. Normand., ser. 5, vol. IX, 1906, p. 126. — *Physma tricolor* A. Zahlbr. in Annal. Mycolog., vol. VI, 1908, p. 132. — Lechler, Plant. Chilens. exsicc. no. 637!

Masatierra: Portezuelo de Villagra, bei 500 m, auf Ästchen der *Fagara Mayu,* fruchtend (C. und I. Skottsberg).

Leptogium (Ach.) S. Gray.

A. Thallus subtus nudus, rhizinis nullis.
  a. Apothecia pustulis thalli inflatis, excavatis immersa; margo thallinus plicato-rugosus *L. phyllocarpum.*
  b. Apothecia peltato-sessilia, lecanorina; margo ± integer.
    α. Thallus tenuiter isidiosus *L. caesium.*
    β. Thallus nudus, isidiis destitutus.
      I. Stratum medullare tenue, haud distincte mucosum.
        1. Thallus plumbens vel coerulescens *L. molluccanum.*
        2. Thallus atroviridis *L. moluccanum* f. *marianum.*
      II. Stratum medullare bene evolutum et bene mucosum *L. tremelloides.*

B. Thallus subtus dense albo-rhizinosus *L. Menziesii.*

C. Thallus utrinque tomentosus *L. callithamnium.*

*__L. moluccanum__ Wain.

Wain., Étud. Lich. Brésil, vol. I, 1890 p. 223; A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 12. — *Collema moluccanum* Pers. apud Gaudich., Voy. Uranie, Bot., 1826, p. 203.

Häufig auf Juan Fernandez.

Masatierra: Quebrada Damajuana, 248 m, auf Baumrinden im Walde, fruchtend; Bahía Cumberland, Cordón Central, 530 m, auf *Dendroseris,* fruchtend, Valle Colonial, Quebrada del Portezuelo, 349 m, im Walde auf Rinden, fruchtend; Quebrada seca, auf *Dendroseris micrantha;* Quebrada Monte Maderugo, auf Rinden; Cordón Salsipuedes, auf *Margyricarpus,* fruchtend; Rücken zwischen Quebrada Laura und Quebrada Piedra agujereada, 625 m, auf Rinden, fruchtend (C. und I. Skottsberg).

Masafuera: Quebrada de la Lobería, 250—300 m, auf Baumrinden und Steinen im Walde, fruchtend (C. und I. Skottsberg).

f. **marianum** Wain.

Wain., Étud. Lich. Brésil, vol. I, 1890, p. 224. — *Collema marianum* Pers. apud Gaudich., Voy. Uranie, Bot., 1826, p. 203; Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93.

Masatierra: Auf Baumrinden (Bertero no. 1645). — Vielleicht nur der Typus der Art.

L. tremelloides S. Gray.

S. Gray, A Natur. Arrang. Brit. Plants, vol. I, 1821, p. 400; Wain., Étud. Lich. Brésil, vol. I, 1890, p. 224 et in Annal. Acad. Scient. Fennic., ser. A, vol. VI, no. 7, 1915, p. 107. — *Lichen tremelloides* Linn. f., Suppl. Spec. Plant., 1781, p. 450.

Masatierra: Quebrada seca, 435 m, auf *Myrceugenia*-Rinde, fruchtend (C. und I. Skottsberg).

var. **azureum** Nyl.

Nyl. Synops. Lich., vol. I, 1858, p. 125. — *Lichen azureus* Sw. apud Ach., Lichenogr. Suec. Prodr., 1798, p. 137. — *Collema azureum* Ach., Lichenogr. Univers., 1810, p. 664; Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93. — *Leptogium azureum* Mont. apud Webb, Hist. Natur. Iles Canar., vol. III, 2 part., 1840, p. 129; Cromb. in Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223 et in Rep. Voy. Challenger, Bot., 1835, p. 89.

Masatierra: Auf Baumrinden, ohne nähere Standortsangabe (Bertero no. 1640; Moseley).

***L. caesium** Wain.

Wain., Étud. Lich. Brésil, vol. I, 1890, p. 225. — *Collema tremelloides* var. *caesium* Ach., Lichenogr. Univers., 1810, p. 656.

Masatierra: Quebrada seca, 435 m, auf Rinden, steril und Quebrada Juanango, 250 m, auf Rinden, fruchtend (C. und I. Skottsberg).

Masafuera: Quebrada de la Lobería, 280 m, auf glatten Baumrinden, steril (C. und I. Skottsberg).

L. phyllocarpum Mont.

Mont. in Annal. Scienc. Nat., Bot., ser. 3, vol. X, 1848, p. 134; Wain., Étud. Lich. Brésil, vol. I, 1890, p. 230. — *Callema phyllocarpum* Pers. apud Gaudich., Voy. Uranie, Bot., 1826, p. 204; Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93.

Masatierra: Auf Baumzweigen in den feuchteren und kühleren Gebirgswäldern (Bertero no. 1644). Cordón Centinela, 530—600 m, auf Baumästen, fruchtend und Portezuelo de Villagra, bei 500 m, auf *Fagara*-Ästen, fruchtend (C. und I. Skottsberg).

***L. Menziesii** Mont.

Mont. in Annal. Scienc. Nat., Bot., ser. 3, vol. XVIII, 1852, p. 313 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 223, tab. XIII, fig. 5; Nyl., Synops. Lich., vol. I, 1858, p. 128; Hue in Nouv. Archiv. du Muséum, ser. 3. vol. X, 1898, p. 229. — *Lichen Menziesii* Sm. apud Ach., Method. Lich., 1803, p. 221.

Masafuera: im Hochlande, bei 1,200 m, steril (C. und I. Skottsberg).

L. callithamnium Nyl.

Nyl. Synops. Lich., vol. I, 1858, p. 126; Wain, in Annal. Acad. Scient. Fennic., ser. A, vol. VI, 1915, p. 105. — *Sticta callithamnia* Tayl. in Hook., London Journ. of Bot., vol. VI, 1847, p. 183. — *Stictina callithamnia* Müll. Arg. in Flora, vol. LXXI, 1888, p. 164; Stzbgr. in Flora, vol. LXXXI, 1895, p. 137.

Masatierra: ohne Standortsangabe (Bertero no. 1639!); Cordón Centinela, 530 m, auf Baumrinden, steril und Quebrada seca, 435 m, auf Baumrinde, steril (C. und I. Skottsberg).

Den anatomischen Bau des Lagers fand ich mit der Beschreibung Wainio's völlig übereinstimmend; dieser und die Gestalt der Sporen sind für die generiche Zuweisung ausschlaggebend.

Pannariaceae.

Parmeliella Müll. Arg.

A. Thallus caespitoso-polyphyllus ut in Dermatocarpone aquatico, livido-fuscescens, species saxicola *P. symptychia-*

B. Thallus subcrustoso-squamulosus, squamis planis et adpressis, pallidus; species corticola *P. nigrocincta.*

P. nigrocincta Müll. Arg.

Müll. Arg. in Flora, vol. LXIV, 1881, p. 86. — *Parmelia nigrocincta* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 91 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 142; Johow, Estud. Flora Juan Fernandez, 1896, p. 200. — *Pannaria nigrocincta* Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 182 et Synops. Lich., vol. II, 1863, p. 39; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. X, (1908) 1909, p. 204.

Masatierra: ohne Standortsangabe, auf Rinden (Bertero); Cordón Chifladores, 350 m, auf *Robinsonia thurifera,* auf dem Rücken über Pangal, 400 m, und Quebrada seca, 435 m, auf *Coprosma* (C. und I. Skottsberg).

Masafuera: Quebrada Lobería, 300 m, auf Baumrinden (C. und I. Skottsberg).

Parmeliella(?) symptychia A. Zahlbr. nov. comb.

Pannaria symptychia Tuck. in Proceed. Americ. Acad. Acts and Scienc., vol. XII, 1877, p. 168 et Synops. North Americ. Lich., vol. II, 1888, p. 144.

Auf Felsen, ohne nähere Standortsangabe (HILL).

Ich sah diese Flechte nicht und bin über ihre Gattungszugehörigkeit nicht sicher.

Pannaria Del.

A. Thallus omnino paraplectenchymaticus *P. fuegiensis.*

B. Thallus stratosus.

a. Thallus laciniato—incisus; apothecia rufa, sporae 17—30 μ longae *P. rubiginosa.*

b. Thallus fere crustaceus, in margine minute lobulatus; apothecia alutacea; sporae usque 14 μ longae *P. hilaris.*

***P. fuegiensis** A. Zahlbr.

A. ZAHLBR. in Kgl. Svensk. Vet.-Akad. Handl., vol. LVII, no. 6. 1917, p. 13.

Masatierra: Quebrada Juanango, auf abgestorbenen Baumstämmen (C. und I. SKOTTSBERG).

***P. hilaris** A. Zahlbr. nov. spec.

Thallus in hypothallo nigro, tenui primum rosulas parvas, plus minus rotundatas, subplacodiformes, hypothallo arcte adpressas format, rosulae demum confluent et in thallum subcrustaceum, usque 5 cm latum abeunt, thallus valde tenuis, 0,5—0,8 mm crassus, cinereo-caesius, opacus, KHO —, $CaCl_2O_2$ —, in centro utplurimum pulverulento-granulosus, subareolatim rimosus, (areolis parvis) et in ambitu effiguratus, lobi marginales rotundati, incisi vel inciso-crenati, arcte adpressi, ab hypothallo cincti; soredia et isidia desunt; subtus non rhizinosus; superne corticatus, cortex decolor, 24—28 μ crassus, grosse paraplectenchymaticus, cellulis 1—3 superpositis, 6—18 μ latis, valde leptodermaticis, superne strato tenui amorpho tectis; stratum gonidiale latum, gonidiis olivaceis vel olivaceo-aeruginosis, rotundatis, 3,5—4 μ latis, hyphis intricatis, leptodermaticis, usque 1,8 μ crassis; stratum medullare ex hyphis plus minus horizontalibus, densis formatur.

Apothecia lecanorina, adpressa, parva, usque 0,8 mm lata, rotunda, plus minus approximata; discus alutaceus, opacus, epruinosus, subplanus; margo thallinus tenuis, thallo concolor, leviter prominulus, primum subgranulosus, demum integer, paraplectenchymaticus, hyphis flabellatim dispositis, leptodermaticis, stratum gonidiale includens; hymenium decolor, purum, 120—145 μ altum, I e coeruleo aeruginoso-sordidum; hypothecium angustum, decolor, ex hyphis intricatis formatum; paraphyses filiformes, conglutinatae, simplices, eseptatae, ad apicem non latiores; asci anguste clavati, ad apicem rotundati et membrana modice incrassata cincti, 8-spori; sporae in ascis subbiseriales, decolores, simplices, ovali-ellipsoideae, membrana tenui et laevi cinctae, 9—14 μ longae et 6-7,5 μ latae.

Pycnoconidia non visa.

Masatierra: Portezuelo, beim SELKIRK-Denkmal, 600 m, auf der Rinde einer *Robinsonia* (C. und I. SKOTTSBERG).

Habituell kommt diese neue Art noch am meisten der *Pannaria nebulosa* (Hoffm.) nahe, aber die übrigen Merkmale sprechen gegen eine nähere Verwandtschaft.

P. rubiginosa Del.

DEL. in Dictionn. Class. Hist. Nat., vol. XIII, 1828, p. 20; NYL., Synops. Lich., vol. II; 1863, p. 29, tab. IX, fig. 15. — *Lichen rubiginosus* Thunbg. apud ACH., Lichenogr. Suec. Prodrom,- 1798, p. 99. — *Parmelia rubiginosa* Ach., Method. Lich., 1803, p. 212; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 90 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 141; JOHOW, Estud. Flora Juan Fernandez, 1896, p. 199.

Masatierra: Auf Rinde der *Myrceugenia,* ohne nähere Standortsangabe (BERTERO no. 1632, 3008); Plazoleta del Yunque, über Moosen (C. und I. SKOTTSBERG).

*var **vulcanica** A. Zahlbr. nov. var.

Thallo microphyllino et sporis brevioribus differt a typo.

Squamulae thalli minutae, incisae, in centro thalli plus minus congestae, ad ambitum thalli dispersae, in hypothallo atro sedentes; sporae 13—16 μ longae et 8—9 μ latae.

Vielleicht handelt es sich um eine eigene Art, doch war das mir vorliegende Material zur Entscheidung der Frage nicht ausreichend.

Masatierra: Cerro Damajuana, auf losen Steinen im Wald (C. und I. SKOTTSBERG).

Massalongia Körb.

***M. carnosa** Körb.

KÖRB. Syst. Lich. German., 1855, p. 109; A. L. SMITH, Handb. Brit. Lich., vol. I, 1918, p. 88, tab 30. — *Lichen carnosus* Dicks., Fasc. Plant. Crypt. Brit., vol. II, 1790, p. 21, tab. VI, fig. 7.

Masafuera: auf Blöcken beim Campo Correspondencia, 1150 m (C. und I. SKOTTSBERG).

Psoroma Nyl.

A. Species saxicola, thallus sorediis instructus *P. vulcanicum.*
B. Species ad cortices, ligna vel muscos vigentes; thallus esorediosus.
  a. Thallus cephalodiis praeditus *P. cephalodinum.*
  b. Thallus cephalodiis destitutus.
    I. Thallus squamosus.
      1. Thallus luteo-pallens.
        α. Squamae thalli substrato adpressae *P. pholidotum.*

β. Squamae thalli ± erectiusculae *P. dasycladum.*
2. Thallus lurido-cervinus *P. sphinctrinum.*
II. Thallus ramoso-divisis *P. angustisectum.*

***P. vulcanicum** A. Zahlbr. nov. spec.

Thallus epilithicus, maculatim effusus, subtartareus, alutaceus vel pallide cervinus, opacus, KHO vix mutatus, Ca Cl_2O_2 —, versus ambitum squamulosus, squamulis parvis, 0,3—0,8 mm latis, rotundatis, planis, integris vel incisis, plus minus dispersis et hypothallo atro insidentibus, centrum versus granulosus vel subgranulosus, granulis congestis, demum subareolatim fissis, passim sorediosus, sorediis leprosis, depressis, canis, rotundatis, planiusculis, thallum non superantibus; superne corticatus, cortice 24—28 μ alto, paraplectenchymatico, cellulis rotundatis, luminibus 5—9 μ latis praeditis, membrana mediocri cinctis, superne strato angusto, fuscescente tecto; caeterum fere homoeomericus, cellulis gonidiorum plus minus globosis, usque 15 μ latis, contentu laete viridi, membrana mediocri cincti, subtus anguste nigricantifuscus et ex hyphis intricatis formatus.

Apothecia lecanorina, sessilia, ad basin breviter constricta, rotundata et dispersa, vel approximata et dein pressione mutua subangulosa, 1—1,2 mm lata; discus rufus, opacus, planiusculus; margo thallinus integer, primum bene prominulus et crassiusculus, demum plus minus depressus et subcrenulatus, extus corticatus, cortice paraplectenchymatico, superne angustiore, e seriebus cellularum 1—4, rotundatis formato, gonidia copiosa includens; excipulum infra hymenium bene evolutum, ad latere hymenii angustatum, sordide fuscescens, ex hyphis intricatis formatum et maculis minutis rotundatisque praeditum; hypothecium decolor, sat tenue, ex hyphis tenuissimis et intricatis formatum, hymenium superne dilute fuscescens, caeterum decolor et purum, usque 180 μ altum, I e sordide coerulescente cupreo-rufescens; paraphyses filiformes, dense contextae, strictae, simplices, eseptatae, ad apicem non latiores; asci anguste clavati, hymenio subaequilongi, ad apicem rotundati et ibidem membrana paulum incrassata cincti, 8-spori; sporae in ascis subuniseriales, decolores, simplices, ovali-ellipsoideae vel ellipsoideae, in uno apice vel utrinque acutatae, membrana leviter granulosa cinctae, 17—21 μ longae et 7,5—8,5 μ latae.

Pycnoconidia ignota.

Masafuera: Heide auf dem Hochland, 1100—1300 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Die charakteristischen Merkmale liegen in dem mehr weniger körnigen Lager, dem Vorhandensein der Soredien und in der Farbe und Berandung der Apothezien.

***P. cephalodinum** A. Zahlbr. nov. spec. — Taf. 24, Fig. 7.

Thallus placodinus, substrato adpressus, plagas usque 3,5 cm latas formans, lutescenti-pallidus passim albidus, opacus, KHO —, Ca Cl_2O_2 —, tenuis, usque 0,2 mm crassus, lobi marginales continui vel subimbricati, distanter divisi, in apice paulum latiores, in margine incisi et amguste pallidiores, usque 2 mm lati, planiusculi vel subcanaliculati, superne nudi, in centro lobulis minoribus vel hinc inde subsquamulosus, subtus nigrescens, sorediis et isidiis nullis,

sed in superficie cephalodiis dispersis obsitus, superne corticatus, cortice angusto, 18—24 μ crasso, paraplectenchymatico, cellulis superpositis 2—3, lumine plus minus rotundo, parietibus crassiusculis; stratum gonidiale infra corticem situm et eo paulum latius, continuum, cellulis laete viridibus, globosis, 9—12 μ latis, membrana distincta cinctis; medulla alba, ex hyphis intricatis, non inspersis formata, hyphis ad 3 μ crassis, leptodermaticis, inferne in stratum angustum nigricantem abeuntibus; cephalodia 1—1,8 mm lata, depressa, in ambitu rotundata vel irregularia, in superficie paulum inaequalia, subfarinosa vel granulosa, coerulescenti-cinerea vel plumbea, ex hyphis dense intricatis, 1,7—1,8 μ latis, leptodermaticis, increbre septatis formata, gonidia concatenata et hinc inde glomerulosa, pallide olivacea, rotundata vel oblonga, rarius subirregularia, 5—8 μ lata, membrana tenuissima cincta includentia.

Apothecia lecanorina, sessilia, usque 2 mm lata, ad basin bene constricta, copiosa et approximata, rotunda vel rotundata; discus in juventute pruinosus, demum nudus, alutaceus vel alutaceo-rufescens, opacus; margo thallinus crassiusculus, crenulatus, prominulus et plus minus inflexus, extus strato corticali, ex hyphis intricatis et inspersis formato, usque 20 μ crasso, ad basin latiore abductus, gonidia copiosa, usque ad verticem marginis penetrantibus includens; excipulum dimidiatum, decolor, ex hyphis tangentialibus et dense conglutinatis formatum; hymenium decolor, tantum superne anguste fuscescens et inspersum, caeterum purum, I e coeruleo lutescenti-obscuratum; hypothecium lutescens, molle, inferne substipitato-productum et strato medullari thalli superpositum; paraphyses filiformes, ad 2 μ latae, conglutinatae, simplices, eseptatae, ad apices haud latiores; asci oblongo- vel ellipsoideo-clavati, hymenio paulum breviores, ad apicem rotundati et membrana bene incrassata cincti, 8-spori; sporae in ascis biseriales, decolores, simplices, ellipsoideae vel ovali-ellipsoideae, membrana tenui et sublaevi (subindistincte granulosa) cinctae, 11—15,5 μ longae et 8,5—9 μ latae.

Pycnoconidia non visa.

Masatierra: Cordón Chifladores, 350 m, auf *Drimys*-Rinde (C. und I. Skottsberg).

Das plakodiale Wachstum des Lagers und das Vorhandensein von Zephalodien kennzeichnen die Art gut.

P. pholidotum Müll. Arg.

Müll. Arg. in Flora, vol. LXXI, 1888, p. 45 (excl. syn.). — *Parmelia pholidota* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 91 et apud Gay, Hist Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 146; Johow, Estud. Flora Juan Fernandez, 1896, p. 200. — *Pannaria pholidota* Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 182, Synops. Lich., vol. II, 1863, p. 30; Hue in Nouv. Archiv., du Muséum, ser. 4, vol. X, (1908) 1909, p. 171.

Masatierra: Auf *Drimys*-Rinde, ohne nähere Standortsangabe (Bertero no. 1623, 1626), Cordón Chifladores, 350 m, auf Stämmen der *Robinsonia thurifera;* Rabanal, auf *Robinsonia gracilis;* Valle Colonial, Quebrada seca, 435 m, auf *Dendroseris micrantha;* Portezuelo, beim Selkirk-Denkmal, 590 m, auf *Robinsonia gracilis;* Cordón Salsipuedes, 625 m, auf *Margyricarpus* (C. und I. Skottsberg).

P. sphinctrinum Nyl.

Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 181 et Synops. Lich., vol. II, 1863, p 24; Reinke in Pringsh., Jahrb. für wiss. Bot., vol. XXVIII, 1895, p. 446, fig. 165 et 166. — *Parmelia sphinctrina* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 90 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 139; Johow, Estud. Flora Juan Fernandez, 1896, p. 199. — *Pannaria sphinctrina* Hue in Bull. Soc. Bot. France, vol. XLVIII, (1901) 1902, p. LVI et in Nouv. Archiv. der Muséum, ser. 4, vol. VIII, 1907, p. 265.

Masatierra: auf Rinden, ohne nähere Standortsangabe (Bertero no. 1625, 1630); Cordón Chifladores, 350 m, auf der Rinde der *Robinsonia thurifera* und auf *Drimys;* Cordón Centinela, 530 m, auf *Dendroseris micrantha;* Portezuelo, auf Rinden beim Selkirk-Denkmal, 590 m, auf *Robinsonia gracilis;* Quebrada seca, 435 m, auf *Dendroseris micrantha;* Cordón Salsipuedes, auf *Drimys;* Quebrada Juanango, 250 m, auf Baumrinden (C. und I. Skottsberg).

Masafuera: Cordón del Barril, auf *Drimys*-Stämmen (C. und I. Skottsberg).

var. **leprolomum** Nyl.

Nyl., Lich. Nov. Zeland., 1888, p. 52. — *Lecanora sphinctrina* var. *leproloma* Nyl. in Compt.-Rend. Séanc. Acad. Paris, vol. LXXXIII, 1876, p. 89. — *Pannaria sphinctrina* var. *leproloma* Hue in Bull. Soc. Bot. france, vol. XLVIII, 1901, p. LVI et in Nouv. Archiv. du Muséum, ser. 4, vol. VIII, 1907, p. 269.

Masatierra: Cordón Salsipuedes, auf Baumrinden (C. und I. Skottsberg).

var. **crispellum** Nyl.

Nyl. Synops. Lich., vol. II, 1863, p. 25 et Lich. Nov. Zeland., 1888, p. 52.

Masatierra: Portezuelo, c. 600 m, auf der Rinde einer *Robinsonia thurifera* (C. und I. Skottsberg).

***P. dasycladum** A. Zahlbr. nov. spec.

Thallus squamulosus, squamulis dense contextis, sat parvis, 1—1,8 mm latis, erectiusculis et plus minus imbricatis, in ambitu thalli rotundato-flabellatis, incisis et crenatis, centralibus magis rotundatis, omnibus tenuibus (0,25—0,4 mm crassis), cervinis vel cervino-fuscidulis, opacis, KHO et $CaCl_2O_2$ non tinctis, epruinosis, in margine passim subplumbeo-cinerascentibus, subtus albidis et nudis, versus insertionem rhizinis nigricantibus obsitis; sorediis et isidiis nullis; superne corticatus, cortice strato amorpho tenui supertecto, decolore, paraplectenchymatico, cellulis minutis, lumine ad 2 μ lato, rotundatis vel subangulosis, membrana mediocri cinctis, in seriebus superpositis 4—10; stratum gonidiale infra corticem dispositum, subcontinuum, ex hyphis in parte superiore plus minus verticalibus, in parte basali magis intricatis formatum, gonidiis globosis, laete viridibus, 10—24 μ latis; cortex hinc inde etiam latera squamulorum obducit; stratum medullare ex hyphis praesertim longitudinalibus, 3—5 μ latis, fasciatim-

subintricatis formata, ad basin squamorum in hyphas coerulescenti-nigricantes, usque 9 μ crassas, sat pachydermaticas et increbre septatas abientibus.

Apothecia lecanorina, inter squamulas sessilia, primum cupuliformia, demum plus minus explanata, ad basin bene constricta, usque 3 mm lata, rotunda vel demum subsinuata; discus obscure rufo-fuscus, opacus, epruinosus, e concaviusculo subplanus vel convexulus, superne inaequalis; margo thallo concolor, sat crassus, prominulus et leviter inflexus, crenulatus vel lobulis parvis incisisque obsitus, corticatus, medullam et gonidia includens; excipulum dimidiatum, ad latera hymenii flabellatum, ad verticem dilatatum, ex hyphis tangentialibus, 1,6—1,8 μ crassis, pachydermaticis et increbre septatis formatum, superne fuscescens, caeterum decolor, molle; hypothecium decolor, ex hyphis intricatis, sat crassis formatum; hymenium superne rufescenti-fuscescens et strato sat angusto, amorpho et decolore obductum, caeterum decolor, purum, I e coerulescente cupreo-sordidulum; paraphyses filiformes, 2—3 μ crassae, conglutinatae (imprimis in parte superiore), simplices, eseptatae, ad apicem haud latiores; asci cylindrico-clavati, ad apicem rotundati, 8-spori; sporae in ascis uniseriales, decolores, simplices, oblongae vel late ellipsoideae, utrinque breviter acutatae, membrana tenui, extus inaequali cinctae, 14—18 μ longae et 8—11 μ latae.

Pycnoconidia non visa.

Masatierra: Felskamm unweit Tres Puntas, 350 m, auf Humuserde (C. und I. SKOTTSBERG).

Durch die Wachstumsweise des Lagers gegenüber den anderen Arten der Gattung gut gekennzeichnet.

***P. angustisectum** A. Zahlbr. nov. spec. — Taf. 25, Fig. 3.

Thallus substrato latiuscule adhaerens, depressus, fusco- vel lurido-flavescens, nitidulus, KHO et $CaCl_2O_2$ non tinctus, ex initiis verruculosis mox iteratim dichotome et sympodialiter ramosus, ramis angustis et elongatis, usque 3 mm longis, 0,16—0,25 mm latis, 0,15—0,17 mm crassis, subtoruloso-inaequalibus, planiusculis vel convexulis, hinc inde minutis, subcorallinis, ramis ultimis ad apicem rotundatis vel subretusis, omnibus superne laevigatis, inferne paulum pallidioribus, erhizinosis; sorediis et isidiis destitutus; protothallus obscuratus nullus; superne corticatus, cortex paraplectenchymaticus, e seriebus cellularum superpositarum 3—5, subangulosarum vel rotundarum, 8—14 μ latarum, membrana tenui cinctarum formatus; pars caetera thalli etiam paraplectenchymaticus, sed cellulae multum minores, in strato gonidiali ex hyphis perpendicularibus, in parte inferiore thalli ex hyphis longitudinalibus, leptodermaticis et crebre septatis formatus; stratum gonidiale infra corticem dispositum, continuum, circa dimidium crassitudinis thalli occupans, gonidiis laete viridibus, globosis, 5—6 μ latis.

Apothecia lecanorina, sessilia, majuscula, usque 5 mm lata, ad basin breviter constricta; discus rufus, opacus, epruinosus, e concavo subplanus; margo thallinus primum verruculosus, mox ramis thallinis corallinoideis, brevibus plus minus obsitus; receptaculum extus laeve, corticatum, cortice crasso, paraplectenchymatico, luminibus cellularum oblongis vel rotundatis, cellulis sat pachydermaticis, in margine crenulato-erosum et ad basin rhizinosum, rhizinis decoloribus, simplicibus, breviusculis, medullam et gonidia includens; excipulum an-

gustum, bene limitatum, usque ad verticem hymenii assurgens, decolor, ex hyphis tangentialibus et conglutinatis formatum; hypothecium angustum, fuscescenti lutescens, molle, ex hyphis intricatis formatum; hymenium superne rufum, caeterum decolor, purum, 140—150 μ altum, I e coeruleo cupreo-obscuratum; paraphyses filiformes, strictae, conglutinatae (imprimis in parte superiore hymenii), simplices, eseptatae, ad apicem vix crassiores; asci hymenio parum breviores, clavati, recti vel subrecti, ad apicem rotundati et membrana parum incrassata cincti, 8-spori; sporae in ascis uni- vel subbiseriales, decolores, simplices, ovales vel ellipsoideo-subfusiformes, membrana tenui, verruculoso-inaequali cinctae, contentu oleoso, 22—38 μ longae et 8—15 μ latae.

Pycnoconidia ignota.

Masatierra: Quebrada Piedra agujereada, bei 650 m, über Moosen, und auf dem Rücken oberhalb Pangal, 795 m, über Moosen und auf dem Erdboden (C. und I. SKOTTSBERG).

Die ersten Thallusanfänge erinnern an das Lager des *Psoroma hypnorum* (Hoffm.); die fertige Flechte hat indes mit disser nichts zu tun, so dass man die Annahme, als läge ein abnorm ausgebildetes Lager derselben vor [etwa wie die var. *thelephoroides* Th. Fr. der *Ochrolechia tartarea* (L.)] zurückweisen muss, denn die anatomischen Verhältnisse und auch andere Merkmale stellen sich einer solchen Annahme entgegen.

Coccocarpia Pers.

***C. Gayana** (Mont.) Nyl. var. **subdivisa** A. Zahlbr. nov. var. — Tab. 24, Fig. 5.

Thallus superne glaucus, opacus, lobatus, lobis substrato adpressis vel imprimis in ramulis arborum plus minus liberis et adscendentibus; lobi adpressi rotundato-incisi, in margine crenulati, concentrice non striati; lobi liberi ± elongati, in margine incisi et crenulati; rhizinae paginis inferioris ad ambitum thalli albae, in centro aeruginoso-nigricantes.

Apothecia habitu iis plantae typicae similia, Receptaculum gonidia nulla includens, extus corticatum, cortice decolore, paraplectenchymatico, e seriebus pluribus cellularum superpositarum formato, cellulis rotundis vel subrotundatis, inferne majoribus, ad 12 μ latis, versus ambitum cubicis sensim minoribus, membrana mediocri cinctis; excipulum integrum, in margine flabellatum, infra hymenium saepe angustius, decolor, ex hyphis tangentialibus, dense contextis formatum; hypothecium dilute luteo-ochraceum, molle, ex hyphis tenuissimis et intricatis formatum; hymenium superne strato tenui et amorpho tectum, decolor, purum, I cupreo-rufum; paraphyses filiformes, simplices, eseptatae, ad apicem non incrassatae, conglutinatae; asci hymenio breviores, clavati, 4-spori; spori in ascis biseriales, decolores, simplices, ovales vel ellipsoideo-ovales, membrana tenui laevique cinctae, contentu oleoso-pellucido, 12—14 μ longae et 7—7,5 μ latae.

Masatierra: auf dem Abhange über Pangal, bei 795 m, auf Baumzweiglein (C. und I. SKOTTSBERG).

Stictaceae.

Lobaria Schreb.

L. crenulata Trevis.

Trevis. Lichenoth. Veneta, 1869, no. 75; Wain., Étud. Lich. Brésil, vol. I, 1890, p. 197; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 35. — *Parmelia crenulata* Hook. apud Kunth, Synops. Plant. Aequin. Orb. Novi, vol. I, 1822, p. 23; Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 90 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 130; Johow, Estud. Flora Juan Fernand., 1896, p. 199. — *Sticta crenulata* Del., Hist. Lich. Sticta, 1822, p. 128, tab. XIV, fig. 53. — *Ricasolia crenulata* Nyl. in Mémoir. Soc. Scienc. Nat. Cherbourg, vol. V, 1857, p. 104 et Synops. Lich., vol. I, 1860, p. 372.

Masatierra: auf Rinden in den Wäldern der höheren Berge (Bertero no. 1633); Quebrada Juanango, 250 m, auf Baumstämmen, reichlich fruchtend (C. und I. Skottsberg).

Sticta Schreb.

Conspectus specierum:

A. Gonidia nostocacea *(Stictina).*
  a. Thallus subtus cyphellis veris praeditus.
    I. Thallus monophyllus, saepe lobatus, lobis latis et rotundatis, in margine non isidiosis *St. fuliginosa.*
    II. Thallus laciniatus vel lobato-laciniatus, lobis angustioribus et in magrine plus minus coralloideo-isidiosis *St. Weigelii.*
  b. Thallus subtus pseudocyphellis praeditus.
    I. Pseudocyphellae albae.
      1. Thallus superne maculis vel sorediis albis cinereisve ornatus.
        α. Thalli lobi in margine nudi, esorediosi *St. argyracea.*
        β. Thalli lobi in margine albosorediati *St. intricata.*
      2. Thallus superne sorediis destitutus.
        α. Lobi thalli angusti, in margine integri, canaliculati *St. fragillima.*
        β. Lobi thalli latiores, in margine rotundato-incisi, plani vel subplani, nunquam canaliculati *St. cinnamomea.*
    II. Pseudocyphellae citrinae vel luteae.
      1. Thallus superne aequaliter reticulato-lacunosus *St. Berteroana.*
      2. Thallus superne plus minus laevigatus, nunquam lacunosus.
        α. Thallus superne plus minus hirsutus vel puberulus.
          §. Thallus superne hirsutus, cervinus vel rufescens, subtus concolor *St. hirsuta.*
          §§. Thallus superne puberulus, murinus, subtus cervino-pallidus *St. Guillemini.*
        β. Thallus superne nudus.

§. Sporae biloculares *St. carpoloma.*
§§. Sporae quadriloculares *St. Mougeotiana.*

B. Gonidia palmellacea vel cystococcoidea *(Eusticta).*
a. Thallus subtus cyphellis veris praeditus.
I. Thallus stipitatus; medulla KHO non tincta.
1. Lobi thalli plus minus lineares *St. lincariloba.*
2. Lobi thalli rotundati et latiores *St. latifrons.*
II. Thallus non stipitatus; medulla KHO sanguineo-rubens *St. laciniata* var. *denudata.*
b. Thallus subtus pseudocyphellis praeditus.
I. Pseudocyphellae albae.
1. Receptaculum apotheciorum gonidia includens *St. Freycinetii.*
2. Receptaculum gonidiis nullis *St. Richardi.*
II. Pseudocyphellae luteae vel flavae.
1. Receptaculum gonidiis destitutum; sporae incolores *St. nitida.*
2. Receptaculum gonidia includens; sporae plus minus obscuratae, rarius decolores.
α. Apothecia marginalia *St. aurata.*
β. Apothecia superficialia *St. orygmaea.*

A. Sect. **Stictina** (Nyl.) Hue.

S. argyracea Del.

Del. Hist. Lich. Sticta, 1822, p. 91, tab. VII, fig. 3; Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 116; Hellb. in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXI, afd. III, no. 13, 1896, p. 29; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 87. — *Lichen argyraceus* Bory apud Del., l. s. c. — *Stictina argyracea* Nyl., Synops. Lich., vol. I, 1860, p. 334. — *Pseudocyphellaria argyracea* Wain. in Hedwigia, vol. XXXVII, 1898, p. (34).

Masatierra: Auf Baumrinden, ohne Standortsangabe (Bertero) Portezuelo, 590—600 m, steril (C. und I. Skottsberg).

Masafuera: auf dem zentralen Hochplateau, bei 1,200 m, in einer Form mit etwas breiteren Lagerabschnitten (C. und I. Skottsberg).

var. *sorediifera Del.

Del. Hist. Lich. Sticta, 1822, p. 92, tab. VII, fig. 31. — *Stictina argyracea* var. *sorediifera* Nyl., Synops. Lich., vol. I, 1860, p. 334. — *Pseudocyphellaria argyracea* var. *sorediifera* Hellb. in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXV, afd. III, no. 6, 1899, p. 24.

Masatierra: Puerto Frances, 500 m, fruchtend (C. und I. Skottsberg).

var. **verrucosa** Mont.

Mont. apud Gay, Hist. Fisic. y Polit. Chilè, Bot., vol. VIII, 1852, p. 116; Johow, Estud. Flora Juan Fernand., 1896, p. 198.

Masatierra: Auf Baumrinden in den höher gelegenen Wäldern (Bertero). Ich sah diese Form nicht; wahrscheinlich dürfte es sich nur um eine krankhafte Bildung handeln.

S. intricata Del.

Del. Hist. Lich. Sticta, 1822, p. 96, tab. VII, fig. 33. — *Stictina intricata* Nyl., Synops. Lich., vol. I, 1860, p. 334. — *Pseudocyphellaria intricata* Wain. in Hedwigia, vol. XXXVII, 1898, p. (36).

Ohne nähere Standortsangabe, in einer Form mit schwärzlicher Lagerunterseite (nach Nylander a. a. O.)

***S. fragillima** Bab.

Bab. apud Hook., Flora Nov.-Zeland., vol. II, 1855, p. 279. — *Stictina fragillima* Nyl., Synops. Lich., vol. I, 1860, p. 335; Reinke in Pringsh. Jahrb. für wiss. Bot., vol. XXVIII, 1895, p. 440, fig. 156, II; Stzbgr. in Flora, vol. LXXXI, 1895, p. 128.

Masatierra: auf dem Bergrücken zwischen Quebrada Piedra agujereada und Quebrada Laura, 625 m, über Moosen, steril (C. und I. Skottsberg).

Masafuera: Quebrada Lobería, 280 m, auf Baumstämmen im Walde (C. und I. Skottsberg).

var. ***linearis** A. Zahlbr. nov. comb.

Stictina fragillima var. *linearis* Müll. Arg.! in Flora, vol. LXXI, 1888, p. 23; Stzbgr. in Flora, vol. LXXXI, 1895, p. 129.

Masatierra: auf dem Bergrücken zwischen Quebrada Piedra agujereada und Quebrada Laura, 625 m, auf Baumzweigen; Cordón Central, 450 m, über Moosen, steril; Portezuelo, 600 m, auf Stämmen der *Robinsonia thurifera;* Cordón Salsipuedes, 500 m, auf *Drimys,* steril (C. und I. Skottsberg).

[**Sticta subvariabilis** Nyl.

Cromb. in Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223 et apud Hemsl., Rep. Challenger, p. 90; Johow, Estud. Flora Juan Fernand., 1896, p. 199.

Masatierra: auf moosigen Baumstämmen (Moseley). Habituell gleicht die *Sticta subvariabilis* Nyl. sehr der vorher genannten Art, der einzig greifbare Unterschied liegt in den Gonidien, welche bei der Ersteren dem Palmellaceentypus angehören (vergl. Stzbgr. in Flora, vol. LXXXI, 1895, p. 114). Ich fand in der reichen Ausbeute Skottsberg's auch nicht ein Exemplar der Nylander'schen Art und bezweifle, ob die Pflanze Moseley's dazu gehört; ich halte sie eher für *Sticta fragillima* var. *linearis.* Jedenfalls müsste die von

MOSELEY gesammelte Flechte auf ihre Gonidien geprüft werden, bevor man *Sticta subvariabilis* als Bürger der Flechtenflora von Juan Fernandez aufnimmt.]

***S. cinnamomea** A. Rich.

A. RICH., Voyage de Découv. de l'Astrolabe, Bot., vol. I, 1852, p. 28, tab. VIII, fig. 3; HELLB. in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXI, afd. III, no. 13, 1896, p. 32. — *Stictina cinnamomea* Müll. Arg. in Flora, vol. LXVI, 1883, p. 22. — *Pseudocyphellaria cinnamomea* Wain. in Philipp. Journ. Scienc., sect. C., vol. VIII, 1913, p. 120. — *Stictina fragillima* var. *dissimilis* Nyl., Synops. Lich., vol. I, 1860, p. 336; STZBGR. in Flora, vol. LXXXI, 1895, p. 129.

Masatierra: Bahía Cumberland, auf Baumrinde, steril; Portezuelo, 350—550 m, auf Baumstämmen, steril; Quebrada Juanango, 250, auf Baumrinden, steril; am Fusse des Berges El Yunque, 2—300 m (C. und I. SKOTTSBERG).

Masafuera: Auf dem Zentralplateau und nördlich des Höhenkammes, auf *Dicksonia;* Cordón Atravesado und Cordón del Barril, bei 1300 m, steril (C. und I. SKOTTSBERG).

S. Berteroana Mont. — Taf. 24, Fig. 1.

MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 90 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 125; JOHOW, Estud. Flora Juan Fernand., 1896, p. 199; A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 16 — *Stictina Berteroana* Nyl. apud STZBGR. in Flora, vol. LXXXI, 1895, p. 128; NYL. in Acta Soc. Scient. Fennic., vol. XXVI, 1900, no. 10, p. 8, not.

Apothecia versus centrum thalli sparsa vel approximata, subpedicellata, ad basin parum constricta, rotunda, primum cupuliformia, margine inflexo, crassiusculo, lurido, opaco, subintegro, demum dilatata, usque 3 mm lata, plana vel modice convexa, margine angustiore, tenui et crenulato, demum fere evanido; discus in juventute caesio-pruinosulus, demum nudus, fusco niger, opacus; receptaculum extus ochraceo-pallidum, parum inaequale, corticatum, cortice paraplectenchymatico, cellulis rotundis, sat pachydermaticis, pedicellum obducente et in corticem thalli paginae superioris abeunte, superne in ambitu fimbriato-eroso, in parte basali inaequali et ibidem ciliis increbris, obfuscatis munito, medullam angustam, ex hyphis laxiusculis, sublongitudinalibus et ramosis formatam includens, gonidiis destitutum; hypothecium ochraceo-fuscum, ex hyphis intricatis formatum; hymenium 80—100 μ altum, purum, incolor (excepta parte suprema), I e coeruleo rufo- vel cupreo-fuscescens; paraphyses gelatinose conglutinatae, filiformes, simplices, ad apicem clavatae, capite 5—6 μ crasso, strato tenui, amorpho supertectae; asci hymenio paulum breviores, clavati, ad apicem rotundati et membrana paulum incrassata cincti, 8-spori; sporae in ascis biseriales, fuscae, oblongo-ellipsoideae vel subfusiformes, uniseptatae, septo tenui, membrana parum crassiore, 22—29 μ longae et 7—8 μ latae.

Meine frühere Angabe über die Pseudozyphellen muss ich dahin richtigstellen, dass dieselben von *gelber* Farbe sind. Sie sind sehr klein, etwas erhaben und äusserst spärlich.

Masatierra: Auf Baumrinden in der Bergregion (BERTERO no. 1662); Cordón Chifladores, 350 m, auf *Robinsonia thurifera;* Cordón Centinela, 530 m, auf *Dendroseris micrantha;* Quebrada Damajuana, auf losen Steinen im Walde; auf dem Sattel über Pangal, 795 m, auf *Coprosma pyrifolium,* besonders reich fruchtend; im Walde der Bahía Cumberland; auf Baumrinden; Quebrada seca, 435 m, auf *Dendroseris micrantha;* Cordón Salsipuedes, 615 m, auf *Dendroseris pinnata* und *Margyricarpus;* Quebrada Juanango, 250 m, auf Bäumen und Sträuchern, schön fruchtend (C. und I. SKOTTSBERG).

S. hirsuta Mont.

MONT. in Annal Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 88 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 106; Johow, Estud. Flora Juan Fernand., 1896, p. 198. — *Stictina hirsuta* Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. XV, 1861, p. 41; STZTBGR. in Flora, vol. LXXXI, 1895, p. 131. — *Pseudocyphellaria hirsuta* Wain. in Hedwigia, vol. XXXVIII, 1899, p. (187); MALME in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXV, afd. III, no. 6, 1899, p. 18.

Masatierra: Auf Baumrinden (BERTERO). SKOTTSBERG hat diese Art nicht gesammelt; vielleicht bezieht sich die Angabe MONTAGNE's auf die nächste Art.

S. Guillemini Mont.

MONT. in Annal. Scienc. Nat, Bot., ser. 2, vol. IV, 1835, p. 87. — *Sticta hirsuta* var. *Guillemini* Mont. apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 107. — *Stictina Guillemini* Nyl apud HUE in Nouv. Archiv. du Muséum, ser. 3, vol. II, 1890, p. 297; STZBGR. in Flora, vol. LXXXI, 1895, p. 131.

Receptaculum apotheciorum extus pulverulentum, non hirsutum; hypothecium ochraceo-lutescens, ex hyphis intricatis formatum; hymenium 90—100 μ altum, purum, I e coeruleo aeruginascens; paraphyses filiformes, gelatinoso-conglutinatae, simplices, eseptatae, ad apicem clavato-incrassatae; asci ellipsoideo-clavati, ad apicem rotundati et membrana mediocri cincti, 8-spori; sporae in ascis bi- vel subtriseriales, obliquae, flavescentes, ellipsoideae vel elongato-ellipsoideae, ad apices angustato-rotundatae, rectae, triseptatae, 20—25 μ longae et 7,5—9 μ latae.

Von *Sticta hirsuta* durch die Behaarung der Lageroberseite, der helleren Thallusunterseite und die etwas kürzeren Sporen verschieden. STIZENBERGER (a. o. O.) irrt, wenn er für *Sticta Guillemini* die längeren Sporen angibt, in Wirklichkeit ist das Gegenteil der Fall; die Sporen der letzten Art werden bis 36 μ lang und sind beiderseits mehr zugespitzt.

Masatierra: Auf Baumrinden, ohne nähere Standortsangabe (BERTERO); Cordón Chifladores, auf dem Stamme einer *Robinsonia thurifera,* fruchtend (C. und I. SKOTTSBERG).

*var. **stictica** A. Zahlbr. nov. var.

Thallus superne marginem versus tenuiter pubescens, caeterum subnudus vel passim omnino nudus, punctis parvis, cyphelliformibus, emergentibus, luteis

obsitus; receptaculum apotheciorum extus tenuiter pubescens et punctis luteis munitum.

Masatierra: Quebrada Juanango, 250 m, auf Baumrinde, fruchtend (C. und I. SKOTTSBERG).

Das gelegentliche Vorkommen von pseudozyphellenartigen, gelben Punkten auf der Thallusoberseite bei *Sticta hirsuta* erwähnt NYLANDER.

S. carpoloma Del.

DEL., Hist. Lich. Sticta, 1822, p. 159; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 88 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 111; JOHOW, Estud. Flora Juan Fernand., 1896, p. 198. — *Stictina carpoloma* Nyl., Synops. Lich., vol. I, 1860, p. 339; STZBGR. in Flora, vol. LXXXI, 1895, p. 130. — *Pseudocyphellaria carpoloma* Wain. in Hedwigia, vol. XXXVII, 1898, p. 34; MALME in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXV, afd. III, no. 6, 1899, p. 33.

Die Pseudozyphellen sind an den meisten Stücken hellgelb, mitunter fast weiss, aber mit unverkennbarem Stich ins Gelbe.

Masatierra: Auf Baumrinden (BERTERO); an Steilhängen bei Portezuelo, 400—625 m, auf Baumzweigen fruchtend (C. und I. SKOTTSBERG).

Masafuera: Las Torres, bei 1200 m, steril (C. und I. SKOTTSBERG).

*f. **ornata** A. Zahlbr. nov. f.

Thalli lobi in margine in lobulis linearibus, simplicibus vel ramosis dissecti. Pseudocyphellae luteo-albidae; medulla alba.

Masatierra: Portezuelo, bei 600 m, auf Baumrinden, steril und Cordón Salsipuedes, auf Sträuchern, fruchtend (C. und I. SKOTTSBERG).

S. Mougeotiana Del.

DEL., Hist. Lich. Sticta, 1822, p. 62, tab. V, fig. 13; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 88 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol VIII, 1852, p. 110; JOHOW, Estud, Flora Juan Fernand., 1896, p. 198; HUE in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 84. — *Sticta erythroscypha* Tayl. apud HOOK in London Journ. of Bot., vol. VI, 1847, p. 181. — *Stictina Mougeotiana* Nyl., Synops. Lich., vol. I, 1860, p. 340. — *Pseudocyphellaria Mougeotiana* Wain. in Hedwigia, vol. XXXVII, 1898, p. (36).

Masatierra: in der Bergregion auf dem Erdboden und Baumrinden (BERTERO no. 1657, 1659, 1661); Cordón Centinela, 530 m, auf der Erde; Pico Central, 360 m, auf Blöcken, steril; Tres Puntas, 2—300 m, steril (C. und I. SKOTTSBERG).

Masafuera: Cerro Correspondencia, bei 1350 (C. und I. SKOTTSBERG).

*var. **xantholoma** Del.

DEL. Hist. Lich. Sticta, 1822, p. 63, tab. V, fig. 14; HUE in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1890, p. 85. — *Stictina Mougeotiana* var. *xantholoma* Nyl., Synops. Lich., vol. I, 1860, p. 340; STZBGR. in Flora, vol. LXXX,, 1895, p. 131.

Masatierra: Cordón Salsipuedes, 625 m, auf dem Erdboden, in einer mehr kontrakten Form (C. und I. SKOTTSBERG).

Masafuera: häufig im unteren Teil der Heide, oberhalb der Quebrada del Mono, bei 800 m (C. und I. SKOTTSBERG).

var. **aurigera** Nyl.

NYL. in Annal. Scienc. Nat., Bot., ser. 4, vol. XI, 1859, p. 254; HUE in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 85. — *Sticta aurigera* DEL., Hist. Lich. Sticta, 1822, p. 54, tab. III, fig. 8; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 88.

Masatierra: Auf Felsen in den Wäldern (BERTERO).

***S. Weigelii** Isert.

ISERT apud ACH., Lichenogr. Univers, 1810, p. 446; WAIN., Étud. Lich. Brésil, vol. I, 1890, p. 189; HUE in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 94. — *Stictina quercizans* Nyl., Synops. Lich., vol. I, 1860, p. 344. — *Stictina Weigelii* Stzbgr. in Flora, vol. LXXXI, 1895, p. 133.

Masatierra: Tres Puntas, 2—300 m, steril (C. und I. SKOTTSBERG).

In dem obigen Stück sind die Zyphellen sehr klein, gleichen auf den ersten Blick Pseudozyphellen, aber bei näherer Untersuchung findet man an einigen Stellen deutliche echte Zyphellen.

Sect. **Eusticta** Hue.

***S. nitida** Tayl.

Tayl. in HOOK., London. Journ. of Bot., vol. VI, 1847, p. 178; NYL., Synops. Lich., vol. I, 1860, p. 359; STZBGR. in Flora, vol. LXXXI, 1895, p. 116; A ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 19. — *Pseudocyphellaria nitida* Malme in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXV, afd. III, no. 6, 1899, p. 26.

Masafuera: El Barril, bei 1200 m, auf *Drimys*-Stämmen, fruchtend (C. und I. SKOTTSBERG).

S. aurata Ach.

ACH., Method. Lich., 1803, p. 279; DEL., Hist. Lich. Sticta, 1822, p. 49, tab. II, fig. 5; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 88; STZBGR. in Flora, vol. LXXXI, 1895, p. 118; A. ZAHLBR. in Sitzungsber. Akad. Wiss. Wien, math.-naturw. Cl., vol. CXI, Abt. 1, p. 495.

Masatierra: Auf Baumrinden in den Bergwäldern (BERTERO no. 1658); Puerto Frances, auf Baumzweigen; Cordón Chifladores, 350 m, auf Baumrinden; Cordón Centinela, 530 m, auf *Dendroseris micrantha;* Quebrada Damajuana, auf losen Steinen im Walde; Plazoleta del Yunque; Portezuelo, 600 m, auf dem Stamme einer *Robinsonia thurifera;* Quebrada seca, 455 m, auf

Dendroscris micrantha; Quebrada Juanango, 250 m, auf Baumstämmen; alle Stücke nur steril (C. und I. SKOTTSBERG).

S. orygmaea Ach.

ACH., Method. Lich., 1803, p. 276. — *Pseudocyphellaria orygmaea* Malme in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXV, afd. III, no. 6, 1899, p. 28.

Der Formenkreis der *Sticta orygmaea* ist schwierig und durchaus nicht geklärt. In der neueren Zeit haben HUE und MALME versucht, die Arten, bzw. Varietäten besser zu unterscheiden.

HUE (Nouv. Arch. du Muséum, ser. 4, vol. III, 1901, p. 48) unterscheidet zwei Arten: *Sticta endochrysea* und *Sticta orygmaea* und findet, dass das wichtigste Unterscheidungsmerkmal der anatomische Bau der Rinde sei. Bei *Sticta orygmaea* soll die Rinde der Lageroberseite und das Rezeptakulums aus perpendiculär verlaufenden, mit Seitenästen, welche anastomisieren und ein Netzwerk bilden, versehenen eingeschnürten und septierten Hyphen gebildet werden; bei *Sticta endochrysea* soll diese Rinde paraplektenchymatisch sein und mehr wenig eckige dünnwandige Zellen aufweisen, doch wird eine eingehendere Beschreibung der Rinde nur für die zu *Sticta endochrysea* gestellten Varietäten: *Urvillei, flavicans, rubescens* und *orygmaeoides* gebracht, für den Typus selbst als welchen die von DELISE (Hist. Lich. Sticta) auf Tafel I unter Figur 1 gebrachte Abbildung zitiert, wird die Rinde nicht beschrieben. Ich habe an den in Juan Fernandez gesammelten Arten stets nur eine paraplektenchymatische Rinde mit eckigen und dünnwandigen Zellen gesehen, dadurch ergibt sich ein Widerspruch, den ich derzeit noch nicht aufzuklären vermag.

MALME (a. o. O.) führt *Sticta orygmaea* mit den Varietäten *Urvillei* und *flavicans* an; zum Typus wird als Synonym *Sticta endochrysea* var. *orygmaeoides* Nyl. gestellt, aber *Sticta endochrysea* Del. wird nicht erwähnt. Ich bin daher darüber nicht ganz sicher, ob MALME zur Gänze *Sticta endochrysea* mit *Sticta orygmaea* vereinigt, halte dies aber für wahrscheinlich, und dann muss der Speziesname des ACHARIUS als älterer zur Bezeichnung der Art Verwendung finden. Ich halte mich vorläufig daran, betone jedoch, dass über diesen Punkt die Akten noch nicht geschlossen sind und dass erst eine eingehende, auf dem Studium der Urstücke beruhende Behandlung der Frage Klärung zu bringen vermag.

Ich gliedere provisorisch die Art folgendermassen.

Sticta orygmaea.

Lobi thalli majores, superne laevigati	var. *endochrysea.*
Lobi thalli minores, superne scrobiculato-inaequales vel reticulati	*typus speciei.*
Lobi magis divisi, in margine nudi	var. *Durvillei.*
Lobi in margine minute dissecta	var. *flavicans.*

var. **endochrysea** A. Zahlbr. nov. comb.

Sticta endochrysea Del., Hist. Lich. Sticta, 1822, p. 43, tab. I, fig. 1; Mont. in Annal. Scienc Nat. Bot., ser. 2, vol. IV, 1835, p. 87 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 104; Johow, Estud. Flora Juan Fernand., 1896, p. 198; Nyl., Synops. Lich., vol. I, 1860, p. 358; Stzbgr. in Flora, vol. LXXXI, 1895, p. 116; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 48; A. Zahlbr. in Kgl. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 19.

Masatierra: Auf Baumrinden (Bertero no. 1631); El Yunque, 500 m, in den Wäldern des Südhanges, über Moosen fruchtend (C. und I. Skottsberg).

Masafuera: im Hochlande, bei 1200 m und Heide bei Campo Correspondencia, 1,150 m, steril (C. und I. Skottsberg).

var. **Durvillei** A. Zahlbr. nov. comb.

Sticta Durvillei Del., Hist. Lich. Sticta, 1822, p. 170. — *Sticta Urvillei* Bab. apud Hook., Flor. Nov. Zeland., vol. II, 1855, p. 275; Nyl., Synops. Lich., vol. I, 1860, p. 360; Stzbgr. in Flora, vol. LXXXI, 1895, p. 117. — *Sticta imbricatula* Tayl. in Hook., London. Journ. of Bot., vol. VI, 1847, p. 180. — *Pseudocyphellaria orygmaea* var. *Urvillei* Malme in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXV, afd. III, no. 6, 1899, p. 30.

Masatierra: In den höher gelegenen Wäldern, auf Baumrinden (Bertero no. 1662). Cordón Salsipuedes, 615—625 m, auf *Drimys* Stämmen, steril; Puerto Ingles, auf Rinden, fruchtend; Villagra, 250 m, fruchtend (C. und I. Skottsberg).

var. **flavicans** A. Zahlbr. nov comb.

Sticta flavicans Hook. f. et Tayl. in London. Journ. of Bot., vol. III, 1844, p. 648. — *Sticta endochrysea* var. *flavicans* Müll. Arg. in Flora, vol. LXXXI, 1888, p. 136. — *Pseudocyphellaria orygmaea* var. *flavicans* Malme in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXV, afd. III, no. 6, 1899, p. 29.

Masatierra: Quebrada Salsipuedes, bei 500 m, auf *Drimys*-Rinde, steril (C. und I. Skottsberg).

S. lineariloba Nyl.

Nyl., Synops. Lich., vol. I, 1860, p. 355; Stzbgr. in Flora, vol. LXXXI, 1895, p. 124. — *Sticta filicina* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 89 (non alior.); Cromb. in Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223. — *Sticta filicina* var. *lineariloba* Mont. apud Gay, Hist, Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 122; Johow, Estud. Flora Juan Fernand., 1896, p. 199.

Masatierra: ohne nähere Standortsangabe, auf Baumstämmen (Bertero no. 1660; Moseley); Puerto Frances, bei 500 m, fruchtend; Bergrücken zwischen Quebrada Piedra agujereada und Quebrada Laura, 625 m, fruchtend; Portezuelo, 590 m, auf Baumrinden fruchtend; Quebrada seca, 435 m, auf *Dendroseris micrantha*, fruchtend; Cordón Salsipuedes, 625 m, auf Rinden fruchtend (C. und I. Skottsberg).

var. **hypopsila** Nyl.

Nyl., Synops. Lich., vol. I, 1860, p. 355; Cromb. in Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223; Stzbgr. in Flora, vol. LXXXI, 1895, p. 124; Johow, Estud. Flora Juan Fernand., 1896, p. 199. — *Sticta filicina* var. *linearilobа* f. *hypopsila* Mont. in Annal. Scienc. Nat., Bot., ser. 3, vol. XVIII, 1852, p. 308. — *Sticta filicina* var. *linearilobа* Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 125.

Masatierra: an nicht näher bezeichnetem Standorte (Bertero; Moseley); auf dem Bergrücken zwischen Quebrada Laura und Quebrada Piedra agujereada, 625 m, auf Rinden fruchtend; Cordón Central, 390 m, in den Wäldern auf Bäumen, fruchtend; Abhänge bei Portezuelo, 500 m, fruchtend; Cordón Salsipuedes, 500 m, fruchtend; am Fusse des Berges El Yunque, auf Baumrinden fruchtend (C. und I. Skottsberg).

Der Zuschnitt der Thalluslappen ist recht wechselnd. Ausser Individuen mit nur linearen, demnach der Beschreibung entsprechenden Lagerabschnitten, finden sich Stücke, bei denen sich neben den normalen auch verkürzte und gedrängte Lappen vorfinden. Dadurch ändert sich das habituelle Bild dieser Stücke besonders dann, wenn die normalen Lappen nur vereinzelt auftreten, doch ist der Zusammenhang klar. Leicht ist nach dem Äusseren allein die Varietät mit *Sticta laciniata* var. *denudata* Nyl. zu verwechseln, vornehmlich wenn an den eingesammelten Exemplaren der Thallusstiel abgebrochen ist, indes ist es nicht schwer, beide aus einander zu halten, da bei der letzteren Art die Markschicht durch Kalilauge blutrot gefärbt wird.

***S. latifrons** A. Rich.

A. Rich., Voyage de Découv. de l'Astrolabe, Bot., vol. I, 1832, p. 27, tab. VIII, fig. 2; Nyl., Lich. Nov. Zeland., 1888, p. 33; Reinke in Pringsh., Jahrbüch. für wiss., Bot., vol. XXVIII, 1895, p. 441, fig. 157, II et 158; Stzbgr. in Flora, vol. LXXXI, 1895, p. 125; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 80.

Masatierra: auf dem Bergrücken zwischen Quebrada Laura und Quebrada Piedra agujereada, bei 625 m, fruchtend (C. und I. Skottsberg).

War bisher nur aus Neuseeland bekannt.

***S. laciniata** (Huds.) A. Zahlbr. var. **denudata** Nyl.

Synops. Lich., vol. I, 1860, p. 354; Krmph. in Linnaea, vol. XLI, 1877, p. 138; Stzbgr. in Flora, vol. LXXXI, 1895, p. 122.

Masatierra: auf dem Bergrücken zwischen Quebrada Laura und Quebrada Piedra agujereada, 625 m, auf Baumrinden fruchtend; Cordón Centinela, 530 m, auf Baumstämmen steril; auf dem Bergrücken über Pangal, 775–795 m, auf Rinden fruchtend; Quebrada seca, 435 m, auf *Coprosma triflorum*, fruchtend (C. und I. Skottsberg).

S. Freycinetii Del.

Del., Hist. Lich. Sticta. 1822, p. 124, tab. XIV, fig. 51; Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 120; Nyl., Synops. Lich., vol. I, 1860, p. 365; Stzbgr. in Flora, vol. LXXXI, 1895, p. 115; Johow, Estud. Flora Juan Fernand., 1896, p, 199.

Masatierra: ohne Angabe des Standortes (Johow).

Masafuera: auf der Hochebene, 9—1000 m, steril (C. und I. Skottsberg).

var. **fimbriata** Mont.

Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 121. — *Sticta variabilis* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 89.

Masatierra (Bertero): Eine zweifelhafte Form, die erst geklärt werden muss.

var. **lactucaefolia** Müll. Arg.

Müll. Arg. in Mission Scient. Cap Horn, vol. V, 1889, p. 157; A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1907, p. 18. — *Farmelia lactucaefolia* Pers. apud Gaudich., Voyage Uranie, Bot., 1826, p. 199.

Masatierra: ohne nähere Standortsangabe (C. Skottsberg).

S. Richardi Mont.

Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 89 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 110; Johow, Estud. Flora Juan Fernand., 1896, p. 198; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 55. — *Sticta fossulata* var. *Richardi* Nyl., Synops. Lich., vol. I, 1860, p. 364.

Masatierra: in den Bergwäldern auf Baumrinden (Bertero); Portezuelo, 590 m, auf Rinden fruchtend; Cordón Salsipuedes, 500—625 m, auf *Drimys* (C. und I. Skottsberg).

var. **divulsa** Hue.

Hue in Nouv. Archiv. du Muséum, ser. 4, vol. III, 1901, p. 56, tab. II, fig. 1—2. — *Sticta divulsa* Tayl. in London Journ. of Bot., vol. VI, 1847, p. 182. — *Sticta fossulata* f. *divulsa* Stzbgr. in Flora, vol. LXXXI, 1895, p. 114.

Masatierra: Cordón Salsipuedes, 615 m, auf Gesträuchen (C. und I. Skottsberg).

Peltigeraceae.

Nephroma Ach.

A. Gonidia palmellacea vel cystococcoidea; thallus plus minus stramineus.
   a. Thallus major, superne foveolatus et lacunosus, inferne bullatus *N. antarcticum.*

b. Thallus minor, utrinque laevis *N. australe*

B. Gonidia nostocacea; thallus obscurus.

a. Thallus plumbeus, subtus fuscescens et plus minus tomentellus *N. plumbeum.*

b. Thallus castaneo-fuscus, subtus albidus et glaber *N. cellulosum.*

Sect. **Nephromium** (Nyl.) Stzbgr.

N. plumbeum Mont.

Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 100; Johow, Estud. Flora Juan Fernand., 1896, p. 197. — *Peltigera plumbea* Mont. in Annal. Scienc. Nat., Bot, ser. 2, vol. IV, 1835, p. 87. — *Nephromium plumbeum* Nyl. in Mémoir. Soc. Scienc. Nat. Cherbourg, vol. V, 1857, p. 101 et Synops. Lich., vol. I, 1860, p. 321. — *Opisteria plumbea* Wain. in Arkiv för Bot., vol. VIII, no. 4, 1909, p. 93.

Masatierra: auf Baumzweigen in den Bergwäldern (Bertero no. 1656).

N. cellulosum Ach.

Ach., Lichenogr. Univers., 1810, p. 523; Bab. et Mitt. apud Hook., Flora Tasman., vol. II, 1860, p. 345, tab. CXCIX, fig. A. — *Lichen cellulosus* Sm. apud Ach., Method. Lich., 1803, p. 289. — *Nephromium cellulosum* Nyl. in Mémoir. Soc. Scienc. Nat. Cherbourg, vol. V, 1857, p. 101 et Synops. Lich., vol. I, 1860, p. 321. — *Opisteria cellulosa* Wain. in Arkiv för Bot., vol. VIII, no. 4, 1909, p. 93.

Ohne nähere Standortsangabe (nach Nyl. a. o. O).

Masatierra: südliche Abhänge des Portezuelo, 600 m; Quebrada Juanango, 250 m, auf Baumstämmen und auf Zweigen, fruchtend (C. und I. Skottsberg).

Sect. **Eunephroma** Stzbgr.

N. antarcticum Nyl.

Nyl., Synops. Lich., vol. I, 1860, p. 317, tab. VIII, fig. 27; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. II, 1900, p. 106. — *Lichen antarcticus* Wulf. in Jacq., Miscell. Bot. Austr., vol. II, 1781, p. 370, tab. X, fig. 1. — *Opisteria antarctica* Wain. in Arkiv för Bot., vol., VIII, no. 4, 1909, p. 93. — *Nephroma arctica* Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 111 (non alior.).

Masatierra: auf Baumzweigen (Bertero).

Masafuera: Cordón del Barril, 1,200, auf *Drimys* und auf dem Südostabhange des Berges Los Inocentes, 900 m, auf *Drimys* im *Dicksonia*-Wald (C. und I. Skottsberg)

Es unterliegt keinem Zweifel, dass sich die Angabe Montagne's nicht auf *Nephroma arcticum* bezieht. Beide Arten wurden vielfach verwechselt, sie sind habituell sehr ähnlich, Hue und Nylander (an den oben angeführten

Stellen) haben die Unterschiede auseinandergesetzt und legen dabei ein grosses Gewicht auf die Farbe der Lagerunterseite. Indes ist dieses Merkmal nur unter einer gewissen Einschränkung und mit Vorsicht zu benutzen. Bei *Nephroma arcticum* ist, von einem schmalen, hellen Rande abgesehen die Lagerunterseite dunkel; bei *Nephroma antarcticum* hingegen ist die Lagerunterseite zum grössten Teil hell, im Zentrum jedoch ebenfalls mehr oder weniger dunkel, nur fehlen an diesen dunklen Stellen die Rhizinen. Ich betrachte beide als geographische Rassen.

N. australe A. Rich.

A. Rich., Voyage de Découv. de l'Astrolabe, Bot., vol. I, 1832, p. 31, tab. IX, fig. 2; Nyl., Synops. Lich., vol. I, 1860, p. 318; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. II, 1900, p. 106. — *Peltigera australis* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 86. — *Nephromium antarcticum* var. *tenue* Nyl., Synops. Lich., vol. I, 1860, p. 317. — *Opisteria australis* Wain. in Arkiv för Bot., vol. VIII, no. 4, 1909, p. 93.

Masatierra: In den Bergwäldern auf Baumrinden (Bertero no. 1653, 1655).

Peltigera Pers.

***P. rufescens** (Neck.) Humb.

Masatierra: Valle de Anson am Fusse des Cordón Damajuana, auf dem Erdboden, steril; niedriger Rücken bei der Kolonie, 147 m, auf der Erde, steril (C. und I. Skottsberg).

P. polydactyla (Neck.) Hoffm.

Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 87 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 96; Johow, Estud. Flora Juan Fernand., 1896, p. 198.

Masatierra: auf der Erde, auf Baumwurzeln und am Fusse der Baumstämme (Bertero no. 1650).

f. **pellucida** Dietr.

Dietr., Lichenogr. German., 1832—37, p. 27, tab. 128. — *Lichen caninus, pellucidus* Web., Spicil. Flor. Götting., 1778, p. 270. — *Peltidea polydactyla* var. *pellucida* Ach., Method. Lich., 1803, p. 287.

Masafuera: im Hochland, bei 1,200 m, auf der Erde fruchtend (C. und I. Skottsberg).

*var. **dolichorrhiza** Nyl.

Nyl. Synops. Lich., vol. I, 1860, p. 327; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. II, 1900, p. 99. — *Peltigera dolichorrhiza* Nyl., Lich. Nov. Zeland., 1888, p. 43.

Masatierra: Bahía Cumberland bei 200 m, auf moosigen Steinen; Puerto Ingles, an felsigen Abstürzen, 575 m, fruchtend (C. und I. SKOTTSBERG).

Lecideaceae.

Lecidea (Ach.) Th. Fr.

A. Thallus crustaceus, uniformis.
  a. Apothecia biatorina; species corticola *L. mutabilis.*
  b. Apothecia lecideina; species saxicolae.
    I. Hypothecium incolor vel pallidum.
      1. Apothecia in margine primum distincte albo-cincta *L. leucozonata.*
      2. Apothecia semper nigro-marginata.
        α. Paraphyses facile liberae.
          *. Epithecium coerulescens *L. enteroleuca.*
          **. Epithecium fuscescens.
            §. Thallus cinerascens, Ca Cl_2O_2 —, *L. latypea.*
            §§. Thallus flavo-viridescens, Ca Cl_2O_2 rubens *L. viridans.*
        β. Paraphyses conglutinatae *L. leucophaca.*
    II. Hypothecium obscurum, plus minus nigrum et carbonaceum.
      1. Thallus flavidus, discus nudus.
        α. Thallus Ca Cl_2O_2 rubens, pulvinatus *L. cyanosarca.*
        β. Thallus Ca Cl_2O_2 —, crustaceus *L. inactiva.*
      2. Thallus cinereus vel albidus; discus apotheciorum pruinosus *L. avium.*
B. Thallus squamulosus, hepatico-luteus *L. icterica.*

Sect. **Eulecidea** Th. Fr.

L. avium A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, tenuis. 0,2—0,3 mm crassus, cinerascenti-, plumbeo- vel fulvo-cinerascens, KHO e luteo demum sordide aurantiacus vel sordide rubens, Ca Cl_2O_2 —, opacus, effusus, areolatus, areolis fissuris tenuissimis limitatis, parvis 0,3—0,6 (0,8) mm latis, angulosis, planis, superne laevigatis, sorediis et isidiis nullis, in margine thalli protothallo nigricante cinctus; medulla alba, I —, KHO lutescens, Ca Cl_2O_2 —, ex hyphis dense inspersis formata.

Apothecia lecideina, adpresso-sessilia, dispersa, usque 1 mm lata, sed normaliter minora, rotunda, demum in margine leviter sinuoso-flexuosa; discus livido-, subsulphurascenti- vel caesio-pruinosus, opacus, planus vel convexiusculus; margo proprius niger, valde tenuis, persistens, parum prominulus, disco madefacto bene distinctus; excipulum sat angustum, extus nigrum, intus

cinereus (hyphis dense inspersis), infra hymenium leviter inflexum; hypothecium crassiusculum, decolor, ex hyphis intricatis formatum, molle; hymenium superne sordide fuscescens et pulverulentum, NO_5 non tinctum, KHO particulae pulveraceae dissolvuntur, caeterum decolor, purum, I intense violaceo-coeruleum, demum aeruginoso-sordidescens, 70–85 μ altum; paraphyses filiformes, strictae, simplices, eseptatae, ad apicem vix latiores, conglutinatae; asci oblongo-clavati, hymenio subaequilongi, recti, ad apicem rotundati et membrana primum bene incrassata cincti, 8-spori; sporae in ascis biseriales, decolores, simplices, ellipsoideae vel ovali-ellipsoideae, rectae, parvae, 8,5–9 μ longae et plus minus 4 μ latae, membrana tenui cinctae.

Conceptacula pycnoconidiorum minuta, vertice convexo, nigro, nitidulo prominula; perifulcrium dimidiatum, fusco-nigrescens; fulcra exobasidialia; pycnoconidia filiformi-bacillaria, arcuata, rarius hamata, utrinque retusata, 14—17 μ longa et ad 1 μ lata.

Masatierra: niedriger Felsrücken am Südabhang von Tres Puntas und auf dem unweit davon gelegenen »Vogelgipfel», 380 m, an Felswänden (C. und I. SKOTTSBERG).

Der chilenischen *Lecidea aeruginosa* Nyl. ziemlich nahe stehend unterscheidet sie sich von dieser schon durch die Farbe des Lagers.

***L. inactiva** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, sat late expansus, versus ambitum attenuatus, in centro crassior et ibidem usque 1 mm crassus; stramineo- vel isabellino-pallescens vel cremicolor, opacus, KHO e flavo subaurantiacus, Ca Cl_2O_2 non tinctus, KHO + Ca Cl_2O_2 sordide subaurantiacus, minute verruculoso-areolatus et praeterea irregulariter rimosus, areolis 0,2—0,5 (0,7) mm latis, in centro thalli continuis et convexis, in ambitu thalli paulum dispersis et hypothallo tenuissimo, albido insidentibus, ad ipsum ambitum linea nigra tenuique cinctus, sorediis et isidiis destitutus; medulla alba, tartarea, I —.

Apothecia lecideina, primum thallo arcte adpressa, demum sessilia, dispersa vel hinc inde approximata et dein subirregularia, parva, 0,3—0,6 (0,7) mm lata, planiuscula vel demum convexiuscula, nigra, opaca; discus niger, epruinosus; margo proprius primum valde tenuis, haud prominulus, integer, demum depressus et indistinctus; excipulum integrum, fusconigrum, infra hymenium crasse productum; hymenium superne anguste aeruginoso-nigricans vel nigricans, non inspersum, KHO —, NO_5 obscure coeruleum, caeterum pallide coerulescens et purum, 90—100 μ altum, I coeruleum; paraphyses filiformes, strictae, contextae, simplices et eseptatae, ad apicem clavato-capitatae et obscuratae; asci hymenio subaequilongi, oblongo-clavati, ad apicem rotundati et membrana incrassata cincti, 8-spori; sporae in ascis biseriales, decolores, simplices, oblongo-ellipsoideae vel ellipsoideo-ovales, rectae, membrana tenui cinctae, minutae, 8,5—10,5 μ longae et 4,5–5,5 μ latae.

Pycnoconidia non visa.

Masatierra: an Felswänden, Pico Central, 365 m; beim SELKIRK-Denkmal, 590 m; Cordón Salsipuedes, 465 m und Puerto Ingles (C. und I. SKOTTSBERG).

*L. **cyanosarca** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, crassiusculus, usque 2,5 mm altus, pulvinulos leviter convexos vel plus minus deplanatos, demum confluentes formans, isabellinus vel pallide ochraceo-stramineus, opacus, KHO flavens, Ca Cl_2O_2 lateritio-ruber, sat irregulariter vel subareolatim rimosus, fissuris altis et angustis vel paulum hiantibus, in centro plus minus verruculosus, ad ambitum passim subradians, breviter longitudinaliter torulosus, bene determinatus, sed linea obscuriore non cinctus, sorediis et isidiis destitutus; stratum corticale superficiem thalli et latera fissurarum obducens, angustum, 30—40 μ crassum, ex hyphis intricatis et inspersis formatum; medulla alba, crassa, KHO sordide flavens, Ca Cl_2O_2 lateritio-rubens, ex hyphis non amylaceis, inspersis et intricatis formata; stratum gonidiale infra corticem situm, sat crassum, continuum, gonidiis laete viridibus, globosis vel subglobosis, usque 15 μ latis.

Apothecia lecideina, immersa vel adpressa, sed superficiem thalli non superantia, dispersa vel approximata, e rotundo subangulosa, nigra, opaca, parva, usque 1 mm lata, e plano convexiuscula; margo niger, valde tenuis et parum conspicuus, non prominulus; excipulum integrum, sat crassum, fusco-nigrum; hypothecium tenue, pallidum; hymenium superne late aeruginoso-coerulescens, NO_5 magis coeruleum, caeterum decolor, non inspersum, 120—140 μ altum, I intense coeruleum; paraphyses conglutinatae, filiformns, eseptatae, ad apicem clavatae; asci hymenio subaequilongi, oblongo-clavati, ad apicem rotundati et membrana paulum incrassata cincti, 8-spori; sporae in ascis bi- vel triseriales, decolores, simplices, ovales vel ovali-ellipsoideae, rectae, membrana tenui cinctae, 8,5—10 μ longae et 3,5—5 μ latae.

Conceptacula pycnoconidiorum minuta, vertice convexo, nigro, nitidulo thallum paulum superantia; perifulcrium dimidiatum, nigrescens; fulcra exobasidialia; basidia subfiliformia, densa, pycnoconidiis vix longiora; pycnoconidia filiformia, bacillaria, recta vel subrecta, ad apices retusa, 8—9 μ longa et 1—1,5 μ lata.

Masatierra: steinige, trockene Heide bei Tres Puntas (C. und I. Skottsberg).

Masafuera: Cordón del Barril, bei 100 m (C. und I. Skottsberg).

*f. **superfusa** A. Zahlbr. nov. f.

Apothecia tenuiter glauco- vel subsulphureo-suffusa.

Masatierra: Portezuelo del Villagra, beim Selkirk-Denkmal, 590 m, auf Felsen (C und I. Skottsberg).

*L. **leucoplaca** Müll. Arg.

Müll. Arg. in Hedwigia, vol. XXXI, 1892, p. 281.

Thallus crustaceus, uniformis, tartareus, tenuis, lacteus vel cinerascenti-albidus, opacus, KHO —, Ca Cl_2O_2 —, continuus, laevigatus, in margine linea obscuriore non cinctus, sorediis et isidiis destitutus; hyphae medullares non amylaceae.

Apothecia lecideina, sessilia, dispersa vel approximata, rotunda, atra, opaca, usque 1,5 mm lata, e concaviusculo demum convexula vel inaequalia, margo proprius crassus, integer, prominulus, demum depressus; excipulum integrum, inferne (sub hymenio) fere decolor, ex hyphis tangentialibus formatum, in parte marginali crassum, extus anguste nigricans, intus decolor, ex hyphis radiantibus, dense contextis, non septatis formatum; hypothecium angustum, decolor; hymenium superne obscure olivaceum, KHO —, NO_5 —, caeterum decolor et purum; paraphyses filiformes. strictae, simplices, eseptatae, ad apicem vix latiores, dense contextae, in KHO autem facile liberae; asci hymenio paulum breviores, oblongo-clavati, ad apicem rotundati et membrana primum bene incrassata cincti, 8-spori; sporae in ascis subbiseriales, decolores, simplices, ellipsoideae vel ovali-ellipsoideae, membrana tenui cinctae, rectae, 12—14,5 μ longae et 5 – 5,5 μ latae.

Masatierra: an Felsen im obersten Teile des Villagratales (C. und I. Skottsberg).

* **L. leucozonata** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, tenuis, tartareus, cinereus, opacus, KHO —, Ca Cl_2O_2 —, areolatus, areolis confertis, versus ambitum thalli tantum plus minus dispersis, angulosis, 0,5 – 1 mm latis, fissuris tenuibus limitatis, planis vel planiusculis, sorediis et isidiis nullis, hypothallus distinctus non evolutus; medulla alba, KHO —, Ca Cl_2O_2 —, hyphis non amyloideis.

Apothecia lecideina, sessilia, rotunda, usque 1,5 mm lata, dispersa vel approximata; discus niger, fere opacus, epruinosus, e concaviusculo planus, demum convexiusculus vel leviter gibbosus; margo primum leviter prominulus, integer, tenuis, albus, demum obscuratus et depressus; excipulum dimidiatum, crassiusculum, extus fusconigrum, intus pallidum, cinereum vel cinereo-fuscescens; hypothecium angustum, pallide lutescens, molle, ex hyphis intricatis, non inspersis formatum; hymenium superne umbrino-nigricans, KHO —, NO_5 —, non inspersum, caeterum fere decolor et in parte inferiore pallide aeruginoso-coerulescens, 60—80 μ altum, I intense coeruleum; paraphyses filiformes, strictae, simplices, eseptatae, ad apicem clavatae et obscuratae, conglutinatae; asci oblongo-clavati, hymenio subaequilongi, 8-spori; sporae in ascis biseriales, decolores, simplices, late ellipsoideae vel ovales, rectae, membrana tenui cinctae, minutae, 8,5—11 μ longae et 4—6 μ latae.

Pycnoconidia non visa.

Masafuera: Cerro Correspondencia, bei 1,400 m, auf vulkanischem Gestein (C. und I. Skottsberg).

* **L. enteroleuca** Nyl.

Nyl. in Flora, vol. LXIV, 1881, p. 187; Arn. in Flora, vol. LXVII, 1884, p. 558 et Zur Lich., Flora München in Bericht Bayr. Bot. Gesellsch., vol. I, Anhang, 1891, p. 80. — Hepp, Flecht. Europ., no. 129.

Masatierra: Pangal, auf Strandfelsen, und Steilwand unweit des Portezuelopasses, 600 m (C. und I. Skottsberg).

Masafuera: im untersten Teil der Quebrada de las Casas, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

*__L. latypea__ Ach.

ACH., Method. Lich., 1803, suppl., p. 10; ARN. in Flora, vol. LXXVII, 1884, p. 562; WAIN. in Arkiv för Bot., vol. VIII, no. 4, 1909, p. 133.

Masatierra: auf Blöcken zwischen der Kolonie und Pangal (C. und I. SKOTTSBERG).

An den gesammelten Stücken sind die Apothezien etwas kleiner und etwas mehr gewölbt als in den europäischen Exemplaren, übrigens aber ganz übereinstimmend.

*__L. viridans__ Lamy.

LAMY in Bull. Soc. Bot. France, vol. XXV, 1878, p. 446; ARN. in Flora, vol. LXXVII, 1884, p 559; A. L. SMITH, Monogr. Brit. Lich., vol. II, 1911, p. 55. — *Lecidella viridans* Körb., Syst. Lich. German., 1855, p. 242 et Parerg. Lich., 1861, p. 213. — *Biatore viridans* Hepp, Flecht. Europ. no. 726.

Masatierra: Portezuelo de Villagra, 590 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Sect. **Biatora** (Ach.) Br. et Rostr.

__L. mutabilis__ Fée.

FÉE, Suppl. Essai Crypt. Écorc. Officin., 1837, p. 105; tab. XLII, fig. 16; NYL. in Acta Soc. Scient. Fennic., vol. VII, 1863, p. 495; FINK in Contrib U. S. Nation. Herbarium, vol. XIV, 1910, p. 71; A. L. SMITH, Monogr. Brit. Lich., vol. II, 1911, p. 43. — *Biatora vernalis* var. *varians* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 93. — *Biatora mutabilis* Mont. apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 171; JOHOW, Estud. Flora Juan Fernand., 1896, p. 201.

Masatierra: auf Baumrinden (BERTERO no. 1615).

Sect. **Psora** (Hoffm.) Schaer.

*__L. icterica__ Tayl.

TAYL. in HOOK., London Journ. of Bot., vol. VI, 1847, p. 150; NYL in Annal. Scienc. Nat., Bot., ser. 4, vol. XV, 1861, p. 360. — *Biatora icterica* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. II, 1834, p. 373 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 170, tab. XII, fig. 4. — *Lecidea endochlora* Tayl. in HOOK., London Journ. of Bot., vol. VI, 1847, p. 151. — *Lecanora Wrightii* Tuck. im Americ. Journ. Arts and Scienc., ser. 2, vol. XXV, 1858, p. 425. — *Biatora Wrightii* Tuck., Lich. Californ., 1866, p. 31, not. — *Psora icterica* Müll. Arg. in Flora, vol. LXXI, 1888, p. 45; FINK in Contrib. U. N. Nation. Herbar., vol. XIV, 1910, p. 103.

Masafuera: Playa Ancha, am Meeresstrand auf humöser Erde (C. und I. SKOTTSBERG).

Catillaria (Ach.) Th. Fr.

A. Apothecia pallide marginata, habitu lecanarino.
   a. Apothecia nigra; sporae oblongae vel subfusiformes, 14—30 µ longae et 5—7 µ latae *C. endochroma.*
   b. Apothecia pallida, ceracea, livida vel livido-nigricantia; sporae ovales vel ovali-ellipsoideae, 17—20 µ longae et 8—9 µ latae — *C. leucochlora.*

B. Apothecia nigro-marginata, typice lecideina.
   a. Hypothecium obscuratum; apothecia mediocria.
      I. Hypothecium rubrofuscum; sporae 15—19 µ longae et 6—8,5 µ latae *C. intermixta.*
      II. Hypothecium coerulescenti-nigricans, in parte marginali strato albo praeditum; sporae 25—30 µ longae et 12—16 µ crassae *C. melastegia* f. *mesoleucodes.*
   b. Hypothecium decolor; apothecia minuta, convexa et immarginata *C. theobromina.*

*C. intermixta Arn.

ARN. apud GŁOWACKI in Verhandl. zool.-bot. Gesellsch., Wien, vol. XX, 1870, p. 455. — *Lecidea intermixta* Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 161 et Lich. Scandin., 1861, p. 194; HARM. in Bull. Soc. Scienc. Nancy, ser. 2, vol. XXXIII, (1898) 1899, p. 59, tab. XXII, fig. 54. — *Catillaria Laureri* Hepp apud ARN., Lich. exsicc. no. 353 (1867); TH. FR., Lichenogr. Scand., vol. I, 1874, p. 582. — *Biatorina intermixta* Kieffer in Bull. Soc. Hist. Nat. Metz, 1895, p. 84; A. L. SMITH, Monogr. Brit. Lich., vol. II, 1911, p. 125.

Masatierra: Cordón Chifladores, 350 m, auf der Rinde einer *Robinsonia thurifera;* Cordón Centinela, 530, auf Stämmen der *Dendroseris micrantha;* Valle Colonial, Quebrada seca, 435 m, auf *Dendroseris micrantha* und *Fagara* (C. und I. SKOTTSBERG).

*C. melastegia (Nyl.) A. Zahlbr. f. **mesoleucodes** A. Zahlbr. nov. comb.

Lecidea melastegia f. *mesoleucodes* Nyl., Lich. Fueg. et Patagon., 1888, p. 15. — *Catillaria grossa* var. *mesoleucodes* A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 22.

Masatierra: auf dem Bergrücken über Pangal, 400 m, auf *Coprosma pyrifolium* (C. und I. SKOTTSBERG).

Masafuera: Quebrada del Blindado, 446 m, auf der Rinde der *Dendroseris gigantea* und Quebrada de la Lobería, 300 m, auf älterer Lumarinde (C. und I. SKOTTSBERG).

Excipulum crassiusculum, integrum, coeruleo-nigrum, in parte marginali intus anguste decolor; hymenium superne anguste coeruleo-nigrum, caeterum decolor, aquoso-pellucidum, purum, 180—200 µ altum, I e coerulescente mox

cupreo-rufidulum; paraphyses capillares, strictae, simplices, eseptatae, conglutinatae; asci hymenio subaequilongi, oblongo-clavati, superne rotundati et membrana incrassata cincti, 8-spori; sporae in ascis biseriales, decolores, ovales vel ovali-ellipsoideae, utrinque rotundatae, rectae, uniseptatae, septo et membrana tenui, ad septum non constrictae, 26—30 μ longae et 12—15 μ latae.

***C. endochroma** A. Zahlbr.

A. Zahlbr. in Englerr-Prantl, Natürl. Pflanzenfam., 1. Teil, Abt. 1*, 1905, p. 134. — *Lecanora endochroma* Fée, Essai Crypt. Écorc. Officin., 1824, p. 114, tab. XXIX, fig. 1. — *Lecidea endochroma* Nyl. in Flora, vol. XLI, 1858, p. 380 et in Bull. Soc. Linn. Normand., ser. 2, vol. III, 1869, p. 271. — *Psorotheciuni endochromum* Mass. in Atti I. R. Istit. Veneto, ser. 3, vol. V, 1860, p. 261; Müll. Arg. in Revue Mycol., vol. IX, 1887, p. 89. — *Heterothecium endochromum* Fw. in Bot. Zeitung, vol. VIII, 1850, p. 555; Tuck., Synops. North Americ. Lich., vol. II, 1888, p. 55.

Masatierra: Quebrada de la Choza, 250 m, auf Baumrinden im Walde (C. und I. Skottsberg).

C. leucochlora A. Zahlbr. nov. comb.

Parmelia leucochlora Mont.! in Annal. Scienc. Nat., Bot. ser. 3, vol. XVIII, 1852, p. 310 et apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 152. — *Parmelia varia* Fr. var. *leucochlora* Mont. in Annal. Scienc. Nat., Bot., ser. 2. vol. IV, 1835, p. 91. — *Bérengeria leucochlora* Trevis., Spighe e Paglie, 1853, p. 5. — *Lecidea leucochlora* Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 184; Hue in Nouv. Archiv. du Muséum, ser. 3, vol. III, 1891, p. 107. — *Bayrhofferia leucochlora* Trevis. in Rivist. Period. Lavori Accad. Padova, vol. V, 1857, p. 69.

Thallus epiphloeodes, crustaceus, uniformis, sat expansus, tenuis, albidus vel dilute alutaceus, fere opacus, KHO flavens, $Ca\,Cl_2O_2$ —, continuus vel substrato rupto passim irregulariter fissus, utplurimum sat laevigatus vel subpulveraceo-inaequalis, rarius minute granulosus, sorediis et isidiis non praeditus, in margine hinc inde linea tenui nigricante cinctus.

Apothecia pseudolecanorina, sessilia, ad basin leviter constricta, dispersa vel plus minus approximata, rotunda vel rotundata, usque 2 mm lata, e concavo convexiuscula vel convexa, cerina vel livida, demum nigricantia, caesiopruinosa vel subnuda; margo proprius primum bene prominens, integer, disco pallidior, dein flexuosus et demum depressus; excipulum crassum, chondroideum, dimidiatum, in sectione late obtriangulare, decolor vel in margine tenuiter infuscatum, ex hyphis radiantibus, strictis, tenuibus, arcte conglutinatis, eseptatis formatum, I vix lutescens, gonidia nulla includens; hypothecium sat crassum, fere decolor, ex hyphis dense intricatis formatum, I e coeruleo aeruginoso-obscuratum; hymenium superne anguste sordide fuscidulum et pulverulento-inspersum, caeterum decolor et purum, 120—130 μ altum, I primum intense coeruleum, demum in sordide cupreum vergens; paraphyses filiformes, conglutinatae, simplices, eseptatae, ad apicem non latiores; asci hymenio subaequilongi, ovali-clavati, superne rotundati et membrana sat bene incrassata cincti, 8-spori; sporae in ascis bi- vel triseriales, decolores, ovali-ellipsoideae, curvulae,

uniseptatae, septo tenui, ad septum non constrictae, membrana tenui cinctae, 17—20 μ longae et 8—9 μ latae.

Pycnoconidia non visa.

f. **typica** A. Zahlbr. nov. f.

Thallus granulosus, alutaceo-cinerascens.

Masatierra: auf Rinde (BERTERO no. 1616).

Masafuera: Hochplateau zwischen Quebrada Sanchez und Ensenada Toltén, 515 m, auf Baumrinden (C. und I. SKOTTSBERG).

Diese Form entspricht dem MONTAGNE'schen Urstück.

f. **laevigata** A. Zahlbr. nov. f.

Thallus laevigatus, granulis nullis, albidus.

Masatierra: auf dem Rücken des Pangal, 400 m, auf *Coprosma*-Rinde; Portezuelo, beim SELKIRK-Denkmal, 590 m, auf *Robinsonia*-Rinde; Quebrada Salsipuedes, 625 m, auf Rinden (C. und I. SKOTTSBERG).

*__C. theobromina__ A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, substratum tenuissime obducens, late expansus, theobrominus vel passim theobromino-cinerascens, opacus, KHO —, Ca Cl_2O_2 —, continuus, leviter inaequalis, sorediis et isidiis nullis, in margine linea obscuriore non cinctus.

Apothecia sat copiosa, plus minus dispersa, nigra, opaca, lecideina, sessilia, rotunda, mox convexa et demum fere semiglobosa, parva, 0,3—0,4 (— 0,5) mm lata; margo proprius in juventute apotheciorum valde tenuis, integer et vix prominulus, mox depressus; excipulum dimidiatum, fusconigrum, ad basin versus hymenium productum, 18—28 μ crassum; hypothecium fere decolor, molle, ex hyphis intricatis formatum; hymenium superne coceruleo-nigricans, NO_5 intense coeruleum, non inspersum, in centro et in parte marginali dilute coerulescens, caeterum decolor, purum, 34—40 μ altum; paraphyses filiformi-capillares, strictae, conglutinatae, simplices, eseptatae, ad apicem capitatae et obscuratae; asci hymenio subaequilongi, oblongo-clavati, ad apicem rotundati et membrana primum bene incrassata cincti, 8-spori; sporae in ascis biseriales, decolores, oblongae vel ellipsoideo-oblongae, utrinque rotundatae, rectae, uniseptatae, septo et membrana tenui, parvae, 7—8 μ longae et ad 2 μ latae.

Pycnoconidia non visa.

Masatierra: Portezuelo de Villagra, 590 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Megalospora Mey. et Fw.

*__M. versicolor__ A. Zahlbr.

A. ZAHLBR. in ENGLER-PRANTL, Natürl. Pflanzenfamil., 1 Teil, Abt. 1*, 1905, p. 134; RIDDLE in Bull. Torrey Bot. Club, vol. XLIV, 1917, p. 327, tab. XXI, fig. 9. —

Lecanora versicolor Fée, Essai Crypt. Écorc. Officin., 1824, p. 115, tab. XXVIII, fig. 4. — *Lecidea versicolor* Nyl. in Acta Soc. Scient. Fennic., vol. VII, 1863, p. 461. — *Heterothecium versicolor* Fw. in Bot. Zeitung, vol. VIII, 1850, p. 555; Tuck., Synops. North Americ Lich., vol. II, 1888, p. 54. — *Patellaria versicolor* Müll. Arg. in Flora, vol. LXV, 1882, p. 330. — *Biatorina versicolor* Hellb. in Bihang till Kgl. Svensk. Vetensk.-Akad. Handl., vol. XXI, afd. III, no. 13, 1896, p. 109.

var. **microcarpa** A. Zahlbr. nov. var.

Thallus tenuis, albidus, continuus vel imprimis versus ambitum discontinuus et hypothallo cinerascente vel umbrino insidens.

Apothecia nigra, nuda, minuta, 0,2—0,3 mm lata, mox convexa, margine haud conspicuo; sporae 27—38 μ longae et 17—20 μ latae, in ascis binae.

Masatierra: Quebrada Salsipuedes, 615 m, auf Baumzweigen (C. und I. Skottsberg).

Bacidia (De Not.) A. Zahlbr.

A. Apothecia saltem primum distincte pallide marginata.
   I. Hypothallus distinctus deest *B. delapsans.*
   II. Hypothallus distinctus, niger *B. subluteola.*
B. Margo apotheciorum disco concolor.
   I. Apothecia nigra *B. endoleuca.*
   II. Apothecia plus minus fusca.
      a. Sporae crassiores; hymenium superne olivaceo-coerulescens vel nigro-violaceum *B. endoleuca* var. *laurocerasi.*
      b. Sporae graciles, subfiliformes; hymenium superne fuscescens vel subdecolor *B. arcentina* var. *hyposcotina*

*B. endoleuca Kickx.

Kickx, Flore Crypt. Flandr., vol. I, 1857, p. 261; Th. Fr., Lichenogr. Scand., vol. I, 1874, p. 347; Wain. in Acta Soc. Scient. Fennic., vol. LIII, no. 1, 1922, p. 148 et 177. — *Biatora luteola* f. *endoleuca* Nyl. in Bot. Notiser, 1853, p. 98.

Masatierra: Plazoleta del Yunque, 235 m, auf *Aristotelia*-Rinde (C. und I. Skottsberg).

Masafuera: Quebrada Blindado, 440 m, auf der glatten Rinde von *Dendroseris gigantea* (C. und I. Skottsberg).

*var. **laurocerasi** Arn.

Arn. in Flora, vol. LIII, 1870, p. 472; Oliv., Expos. Lich. Ouest France, vol. II, 1900, p. 19. — *Patellaria laurocerasi* Del. apud Duby, Botanic. Gallic., vol. II, 1830, p. 652. — *Bacidia laurocerasi* Wain. in Acta Soc. Scient. Fennic., vol. LIII, no. 1, 1922, p. 147 et 175.

Masatierra: Plazoleta del Yunque, 235 m, auf *Aristotelia*-Rinde (C. und I. Skottsberg).

Masafuera: Hochebene zwischen Quebrada Sanchez und Ensenada Toltén, 515 m, auf Lumarinde (C. und I. SKOTTSBERG).

*B. **arceutina** (Ach.) Arn. var. **hyposcotina** A. Zahlbr. nov. var.

Apothecia usque 1 mm lata, primum rubricoso-fusca, demum obscurata, nigricantia; hypothecium crassiusculum, rufofuscum; hymenium superne dilute fuscescens vel fere decolor, non inspersum, caeterum decolor, 50—70 μ altum, I praecedente coerulescentia mox cupreo-fuscum; paraphyses filiformes, simplices, eseptatae, ad apicem paulum latiores, conglutinatae; asci hymenio subaequilongi, anguste clavati, ad apicem rotundati et membrana modice incrassata cincti, 8-spori; sporae decolores, filiformi-capillares, subrectae, in uno apice leviter latiores, subindistincte pluriseptatae, 42—50 μ longae et ad 1 μ latae.

Masatierra: Cordón Chifladores, 350 m, auf dem Stamme einer *Robinsonia thurifera* (C. und I. SKOTTSBERG).

Habituell gleicht diese neue Varietät der *Bacidia fuscorubella* (Hoffm.), wie sie bei HEPP unter no. 520 ausgegeben ist; die grazilen Sporen zeigen indes, dass sie mit ihr nichts zu tun hat. Das Hypothezium ist schon in den jüngsten Früchten dunkel gefärbt und kräftig entwickelt.

*B. **delapsans** A. Zahlbr. nov. spec.

Thallus epiphloeodes, tenuissimus, substratum arcte obducens, maculas formans irregulares, sat extenuatas, margine linea nigra cinctas et demum plus minus confluentes, lutoso-cinerascens, opacus, KHO lutescens, $Ca\,Cl_2O_2$ —, primum pulverulento-leprosulus, demum leprosus, continuus, sorediis et isidiis non praeditus.

Apothecia lecideina, sessilia, mox elabentia et foveolas rotundas relinquentia, normaliter dispersa, rotunda, minuta, 0.5—0.8 mm lata, e plano mox convexa, umbrino nigricantia, opaca, madefacta magis umbrina; margo proprius primum valde tenuis, integer, cinerascens, mox depressus; excipulum ad ambitum nigricans, intus pallidum, ex hyphis dense intricatis, elementa substrati includentibus formatum, I —; hypothecium crassum, fusconigrum, versus ambitum rufescens, KHO vix mutatum; hymenium angustum, 45—55 μ altum, superne anguste umbrino-fuscum, KHO violaceum, caeterum maculatim dilute fuscescens vel decolor, purum, I e coeruleo mox aeruginoso-obscuratum; paraphyses filiformes, simplices, eseptatae, ad apicem non latiores; asci crebri, oblongo-clavati, ad apicem rotundati et membrana bene incrassata cincti, 8-spori; sporae in ascis subtriseriales, verticales, decolores, aciculari-fusiformes, subrectae vel curvulae, in uno apice rotundatae vel acutatae, in altero apice normaliter fusiformi-acutatae, subindistincte pluriseptatae, 28—45 μ longae et 1,5—1.8 μ latae.

Conceptacula pycnoconidiorum punctiformia, nigra, concavo-emersa; perifulcrium superne obscuratum, caeterum pallidum; fulcra exobasidialia; pycnoconidia oblonga, minuta, 1.8—2 μ longa.

Masatierra: Quebrada Gutierrez, und Quebrada seca, auf Rinde von *Juania australis*, 435 m (C. und I. SKOTTSBERG).

Das Excipulum ist eigentlich dem anatomischen Bau nach lekanorinisch, indem es aus verwebten Hyphen, welche jenen der Markschicht ähnlich sind, gebildet wird. Es scheint sich auch unter das Hypothezium zu erstrecken, doch ist die Begrenzung schwer wahrzunehmen, da die Hyphen beider Schichten wenig verschieden sind. Der Fruchtrand ist demnach hier ähnlich gebaut, wie bei manchen Arten der Gattung *Lecidea* sect. *Eulecidea*, z. B. bei *Lecidea polycarpa* Flk., wo das Verhältnis nur insoferne deutlicher hervortritt, als alle Markhyphen durch Kalilauge blutrot gefärbt werden und diese Färbung sich auch auf die Hyphen des Excipulums erstreckt.

*B. **subluteola** A. Zahlbr.

A. Zahlbr. in Sitzungsber. Akad. Wiss. Wien, math.-naturw, Cl., vol. CXI, Abt. 1, 1902, p. 395 et in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 129. — *Lecidea subluteola* Nyl. in Flora, vol. LII, 1869, p. 122. — *Patellaria subluteola* Müll. Arg. in Flora, vol. LXIV, 1881, p. 522.

Masafuera: Quebrada de la Lobería, 300 m, auf Lumarinde (C. und I. Skottsberg).

Toninia Th. Fr.

*T. (sect. *Eutoninia*) **bullata** A. Zahlbr.

A. Zahlbr. in Beihefte zum Bot. Centralbl., vol. XIX, Abt. II, 1905, p. 70. — *Lecidea bullata* Mey. et Fw. in Nova Acta. Acad. Caes. Leopold.-Carolin., vol. XIX, suppl. 1, 1843, p. 227.

Apothecia primum subpedicellata, cupularia, demum applanata, usque 3 mm lata, rotunda; discus niger, nudus; margo primum crassiusculus, obtusus, inflexus, niger, demum angustatus, minus prominulus et leviter crenulatus; receptaculum subtus primum nigricans et verruculosum, evolutum pallide rufescens, verruculosum, sed verruculae minus prominentes, extus et inferne crassiuscule corticatum, cortice chondroideo, lutescente, ex hyphis ramosis et dense contextis formato; hypothecium angustum, obscure fuscum vel fere nigrum, ex hyphis perpendicularibus formatum; hymenium 70–90 μ crassum, superne anguste nigricans, non inspersum, KHO —, caeterum decolor et purum, I primum coerulescens, tandem sordide aeruginosum; paraphyses filiformes, ad 2 μ crassae, strictae, simplices, primum facile liberae, ad apicem clavatae et obscuratae, clavo 3,5—4 μ lato; asci clavati, ad apicem rotundati, hymenio subaequilongi, recti, membrana in parte apicali primum valde incrassata cincti, 8-spori; sporae in ascis 3—4 seriales, decolores, verticales, subcylindricae, in uno apice paulum latiores, utrinque rotundatae, subrectae vel curvulae, 8—10-loculares, septis pertenuibus, 38—52 μ longae et 3,5—4 μ latae.

Masafuera: über abgestorbenen Moosen beim Correspondencialager, 1,150 m (C. und I. Skottsberg).

Ich hatte bisher die Flechte bevor ich die Apothezien kennen lernte wegen der Gestalt des Lagers bei der sect. *Thalloidima* untergebracht; nunmehr

unterliegt es keinem Zweifel, dass sie zur sect. *Eutoninia* gehört. Der Thallus wurde von MEYER und FLOTOW zutreffend beschrieben, ich füge ergänzungsweise nur hinzu, dass die Lagerwarzen bis 3 mm breit werden, bald zerstreut stehen, bald aneinander gerückt sind.

Lopadium Körb.

*L. leucoxanthum A. Zahlbr.

A. ZAHLBR. in Sitzungsber. Akad. Wiss. Wien, math.-naturw. Cl., vol. CXI, Abt. 1, 1902, p. 398. — *Lecidea leucoxantha* Sprgl. in Kgl. Vetensk.-Akad. Handl., 1820, p. 46.

var. **albidius** A. Zahlbr. nov. var.

Thallus lacteus vel albus. Apothecia usque 2 mm lata, ad basin constricta, basi angusta elato-sessilia; discus croceus vel vitellino-subcroceus; margo proprius crassiusculus, integer, albus vel lutescenti-albidus.

Masatierra: Cordón Chifladores, 350 m, auf Robinsonien; Quebrada seca, 435 m, auf der Rinde einer *Dendroseris micrantha;* Quebrada Salsipuedes, auf Rinden; Quebrada de la Choza, 250 m, auf Baumrinden (C. und I. SKOTTSBERG).

Rhizocarpon DC.

A. Thallus flavus — *R. geographicum.*
B. Thallus cinereus vel albidus.
Sporae 13—16 μ longae et 8,5—9 μ latae — *R. microspermum.*
Sporae 22—30 μ longae et 10—14 μ latae *R. obscuratum* var. *deminutum.*

*R. geographicum (L.) DC. f. **contiguum** (Schaer.) Mass.

Masafuera: auf einem vulkanischen Block im oberen Teil der Quebrada de las Vacas und Strandfelsen in der Quebrada del Mono (C. und I. SKOTTSBERG).

*R. (sect. *Eurhizocarpon*) **microspermum** A. Zahlbr. nov. spec.

Thallus epilithicus, tenuis, crustaceus, uniformis, tartareus, plumbeo- vel cinereo-albidus, opacus, KHO —, Ca Cl_2O_2 —, rimoso-areolatus, areolis parvis, 0,2—1 mm latis, subangulosis, contiguis, planis, fissuris angustis et plus minus flexuosis separatis, superne laevigatus, sorediis et isidiis destitutus, in margine linea obscuriore distincta non cinctus; medulla alba, ex hyphis non amyloideis formata.

Apothecia lecideina, primum inter areolas thalli sedentia, mox elavata et adpresse sessilia, nigra, opaca, rotunda, usque 1 mm lata, dispersa vel approximata, e plano leviter convexa, non umbonata; margo primum leviter prominulus, integer angustusque, demum depressus; excipulum nigrum, integrum, olivaceo-fuscum, infra hymenium sat crassum, ad latera hymenii nigrum; hyme-

nium superne obscure fuscum, KHO haud mutatum, non pulverulentum, caeterum decolor, purum, 130—150 μ altum, I intense coeruleum; paraphyses strictiusculae, subsimplices, gelatinose conglutinatae, eseptatae; asci hymenio subaequilongi, oblongo-clavati, ad apicem rotundati, 8-spori; sporae in ascis 2—3 seriales, decolores, ellipsoideae vel ovales, depauperato-murales, septis horizontalibus 3—4, septo verticali utplurimum unico, halone non circumdatae, parvae, 13—16 μ longae et 8,5—9 μ latae.

Pycnoconidia non visa.

Masafuera: Heide des Hochplateaus, 1000—1200 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Gehört in den Formenkreis des *Rhizocarpon obscuratum* (Ach.) Mass.; die kleinen Sporen und die flachen Areolen des hellen Thallus kennzeichnen die neue Art.

***Rh. obscuratum** (Ach.) Mass. var. **deminutum** A. Zahlbr. nov. var.

Thallus cinereo-caesius, minute areolatus, areolis ad 0,15 mm latis. Apothecia minuta, 0,2—0,3 mm lata, mox convexiuscula; sporae ut in typo.

Masafuera: Cordón del Barril, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Phyllopsoraceae.

Phyllopsora Müll. Arg.

Ph. parvifolia Müll. Arg.

MÜLL. ARG. in Bull. Herbier Boissier, vol. II, 1894, p. 90. — *Lecidea parvifolia* Pers. apud GAUDICH., Voyage Uranic, Bot., 1826, p. 192 — *Parmelia parvifolia* Mont. apud SAGRA, Hist. de d'Ile Cuba, Botan., 1838—42, p. 214, tab. X, fig. 3 et apud GAY, Hist. Fisic y Polit. Chile, Bot., vol. VIII, 1852, p. 145; JOHOW, Estud. Flora Juan Fernand., 1896, p. 200. — *Biatora parvifolia* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 92. — *Lecanora bibula* Tayl. in HOOK., London Journ. of Bot., vol. VI, 1847, p. 160.

Masatierra; auf Baumrinden in den höher gelegenen Bergwäldern (BERTERO no. 1648).

Cladoniaceae.

Baeomyces Pers.

B. chilensis Cromb.

CROMB. in Journ. Linn. Soc London, Bot., vol. XVI, 1876, p. 223; JOHOW, Estud. Flora Juan Fernand., 1896, p. 201. — *Biatora byssoides* var. *chilensis* Mont. apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 173. — *Baeomyces rufus* var. *chilensis* Nyl., Synops. Lich., vol. I, 1860, p. 177.

Masatierra: ohne nähere Standortsangabe (MOSELEY).

Masafuera: an Steinen und Felsen an einem Bache unweit des Correspondencialagers bei 1100 m (C. und I. SKOTTSBERG).

Cladonia (Hill.) Wain.

C. alpestris (L.) Rabh.

WAIN., Monogr. Cladon., vol. I, 1887, p. 41. — *Cladonia rangiferina* var. *alpestris* Schaer.: MONT. apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 166; JOHOW, Estud. Flora Juan Fernand., 1896, p. 196.

Masatierra: zwischen Moosen auf den höheren Bergen (BERTERO no. 1605).

*C. pycnoclada (Gaud.) Nyl. var. **flavida** Wain.

WAIN., Monogr. Cladon., vol. I, 1887, p. 38.

Masatierra: Cordón Salsipuedes, 625, an sonnigen und steinigen Stellen, steril (C. und I. SKOTTSBERG).

Masafuera: unter dem Gipfel von Los Inocentes, steril (C. und I. SKOTTSBERG).

C. bacillaris (S. Gray) Nyl.

WAIN., Monogr. Cladon., vol. I, 1887, p. 88; A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 24.

Masatierra: Bahía Cumberland, auf morschen Baumstrünken (C. SKOTTSBERG).

*C. didyma Wain. var. **vulcanica** (Zoll.) Wain.

WAIN., Monogr. Cladon., vol. I, 1887, p. 145.

Masatierra: auf dem Bergrücken über Pangal, 795 m, auf dem Erdboden, fruchtend (C. und I. SKOTTSBERG).

C. coccifera (L.) Willd. var. **stemmatina** Ach.

WAIN., Monogr. Cladon., vol. I, 1887, p. 158; A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 24. — *Cladonia cornucopioides* Mont. apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 163; JOHOW, Estud. Flora Juan Fernand., 1896, p. 197.

Ohne nähere Standortsangabe (CUMING).

Masatierra: Cordón Salsipuedes, 500—600 m, auf der Erde, fruchtend (C. und I. SKOTTSBERG).

Masafuera: Heide oberhalb Quebrada del Mono, 850 m, schön fruchtend, darunter einige Podezien mit Bechern, welche in ihrer Mitte proliferieren (= f.

asotea Ach.); auf dem Hochplateau, bei 1200 m; Heide unweit des Campo Correspondencia, 1130 m, auf der Erde, fruchtend (C. und I. SKOTTSBERG).

C. aggregata (Sw.) Ach.

WAIN., Monogr. Cladon., vol. I, 1887, p. 224; MONT. apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 167; JOHOW, Estud. Flora Juan Fernand., 1896, p. 196; A. ZAHLBR. in Kgl. Svensk.-Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 25. — *Cladia aggregata* Nyl.; CROMB. in Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223.

Masatierra: ohne nähere Standortsangabe (BERTERO, MOSELEY); Puerto Frances, Loma del Incienso; Portezuelo del Villagra, auf losem Tuff und auf der Erde, steril (C. und I. SKOTTSBERG).

Masafuera: oberhalb Quebrada del Mono, 850 m, auf dem Hochplateau, 1000—1350 m und beim Campo Correspondencia, 1130 m, steril (C. und I. SKOTTSBERG).

var. **straminea** Müll. Arg.

WAIN., Monogr. Cladon., vol. I, 1887, p. 230.

Masatierra: Am Weg nach Portezuelo, 200 m, auf dem Erdboden, steril (C. und I. SKOTTSBERG).

*__Cl. furcata__ (Huds.) Schrad. f. **foliosa** Del.

WAIN., Monogr. Cladon., vol. I, 1887, p. 333.

Masatierra: Cordón Salsipuedes, 615 m, in Buschwerk zwischen Moosen auf der Erde (C. und I. SKOTTSBERG).

Cl. gracilis (L.) Willd.

var. **chordalis** (Flk.) Schaer.

WAIN., Monogr. Cladon., vol. II, 1894, p. 97.

Masatierra: Portezuelo, bei 600 m, zwischen Moosen auf der Erde (C. und I. SKOTTSBERG).

Masafuera: auf dem Hochplateau, 750—1200 m, auf dem Erdboden, fruchtend (C. und I. SKOTTSBERG).

var. **tenera** Nyl.

WAIN., Monogr. Cladon., vol. II, 1894, p. 109.

Ohne nähere Standortsangabe (BERTERO).

var. **aspera** Flk.

WAIN., Monogr. Cladon., vol. II, 1894, p. 110.

Masafuera: Heide unweit des Campo Correspondencia, 1100—1350 m, auf dem Erdboden (C. und I. SKOTTSBERG).

var. **elongata** (Jacqu.) Flk.

WAIN., Monogr. Cladon., vol. II, 1894, p. 116; Mont. in Annal. Scienc, Nat., Bot., ser. 2, vol. IV, 1835, p. 92.

Ohne Standortsangabe (CUMING).

Masatierra: Portezuelo, auf den höheren Bergen auf der Erde (BERTERO no. 1606).

Cl. pyxidata (L.) Fr. var **chlorophaea** Flk.

WAIN., Monogr. Cladon., vol. II, 1894, p. 232.

Ohne Standortsangabe (CUMING).

Masafuera: Heide unweit Correspondencia, bei 1350 m, auf der Erde, fruchtend (C. und I. SKOTTSBERG).

C. fimbriata (L.) Fr. var. **prolifera** (Retz.) Mass.

WAIN., Monogr. Cladon., vol. II, 1894, p. 271. — *Cladonia fimbriata* var. *radiata* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 92 (?).

Masatierra: Auf steinigen Hügeln (BERTERO no. 1607).

var. **Balfourii** (Crb.) Wain.

WAIN., Monogr. Cladon., vol. II, 1894, p. 339.

Masafuera: Quebrada del Mono, an der Basis eines *Dicksonia*-Stammes (C. und I. SKOTTSBERG).

Cl. pityrea (Flk.) Fr.

I. **Zwackhii** f. **scyphifera** (Del.) Wain.

WAIN., Monogr. Cladon., vol. II, 1894, p. 354.

Masatierra; Valle Colonial, auf der Erde, fruchtend (C. und I. SKOTTSBERG).

Masafuera: Heide oberhalb des Monotals, 850 m (C. und I. SKOTTSBERG).

f. **subacuta** Wain.

WAIN., Monogr. Cladon., vol. II, 1894, p. 355.

Masatierra: am Wege zwischen Portezuelo und Villagra, bei 400 m, auf der Erde (C. und I. SKOTTSBERG).

f. **squamulifera** Wain.

Wain., Monogr. Cladon., vol. II, 1894, p. 355.

Masatierra: Cordón Centinela, auf Baumstrünken; Quebrada Monte Maderugo, auf abgestorbenen Baumstämmen (C. und I. Skottsberg).

f. **sorediosa** Wain.

Wain. apud A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 27.

Ohne Standortsangabe (C. Skottsberg).

Stereocaulon Schreb.

A. Phyllocladia linearia, simplicia vel divisa; cephalodia plus minus pedicellata.
   a. Cephalodia gonidiis nostocaceis *S. ramulosum.*
   b. Cephalodia gonidiis scytonemaceis *S. proximum.*
B. Phyllocladia granuliformia; cephalodia sessilia *S. paschale* var. *magellanicum.*

S. paschale (L.) Ach. var. **magellanicum** Nyl.

Nyl. in Mémoir. Soc. Scienc. Nat. Cherbourg, vol. V, 1857, p. 96 et Synops. Lich., vol. I, 1860, p. 243. — *Stereocaulon tomentossum* var. *magellanicum* Th. Fr., De Stereoc. et Piloph. Comment., 1857, p. 31. — *Stereocaulon magellanicum* Th. Fr. in Nova Acta Soc. Scient. Upsal., ser. 3, vol. II, pars 1, 1858, p. 359.

Masatierra: auf Felsen in den Bergen (Bertero no. 29).

Masafuera: auf dem Hochplateau, 1200 m und beim Campo Correspondencia, 1130 m, fruchtend (C. und I. Skottsberg).

***S. proximum** Nyl.

Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. XI, 1859, p. 210 et Synops. Lich., vol. I, 1860, p. 237, tab. VII, fig. 14; Hue in Nouv. Archiv. du Muséum, ser. 2, vol. X, 1898, p. 154. — *Stereocaulon ramulosum* f. *proximum* Tuck. in Proceed. Americ. Acad. Arts and Scienc., vol. VII, 1868, p. 228; Wain. in Annal. Acad. Scient. Fennic., ser. A, vol. VI, no. 7, 1915, p. 25.

Masatierra: Puerto Frances, Loma del Incienso; Cordón Escarpado, 365 m; Portezuelo, auf Felsklippen, 590—600; am Wege zwischen Portezuelo und Villagra, 420 m, auf dem Erdboden; Quebrada Villagra 380 m, auf Felsspalten und Cordón Salsipuedes, 625 m; überall fruchtend (C. und I. Skottsberg).

var. **compactius** A. Zahlbr. nov. var.

Thallus substrato arcte adhaerens, fastigiato-conglomeratus. Podetia usque 3,5 cm alta, 1—1,5 mm lata, stricta, rigida, in parte inferiore phyllocladis fili-

formibus obsita, in parte superiore phyllocladiis verruculoso-inaequalibus, verrucis thallum fere omnino obducentibus et quasi corticem formantibus.

Masafuera: Las Torres, c. 1350 m, auf Gestein, fruchtend und auf der Heide unweit Correspondencia, 1200 m, fruchtend (C. und I. SKOTTSBERG).

Durch das kompakte Wachstum und durch das Fehlen typhischer Phyllokladien im oberen Teile der Podezien von den übrigen Varietäten leicht zu unterscheiden.

S. ramulosum Raenschel.

RAENSCHEL., Nomencl. Bot., edit. 3, 1797, p. 328; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 92 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 154; NYL., Synops. Lich., vol. I, 1860, p. 235; CROMB. in Journ. Linn. Soc. London, Bot., vol. XVI, 1877, p. 223; HUE in Nouv. Archiv. du Muséum, ser. 3, vol. X, 1898, p. 243; REINKE in Pringsh., Jahrbüch. für wiss. Bot., vol. XXVIII, 1895, p. 115, fig. 48, III—IV. — *Lichen ramulosus* Sw., Nova Gener. et Spec. Plant., 1788, p. 147.

Masatierra: auf der Erde und auf Felsen in den Bergen (BERTERO no. 1652; MOSELEY); Klippen bei Portezuelo, 590 m; Cordón Salsipuedes, 615 m; zwischen Villagra und Tres Puntas, 2—300 m (C. und I. SKOTTSBERG).

Masafuera: Las Torres, 1350 m, auf der Erde, fruchtend (C. und I. SKOTTSBERG).

var. **implexum** Nyl.

NYL., Synops. Lich., vol. I, 1860, p. 236, tab. VII, fig. 11; MÜLL. ARG. in Mission. Scient. Cap. Horn, vol. V, 1889, p. 150. — *Stereocaulon implexum* Th. Fr., De Stereoc. et Piloph. Comment., 1857, p. 23; WAIN., Étud. Lich. Brésil, vol. I, 1890, p. 68. — *Stereocaulon corallinum* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 92 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 155; JOHOW, Estud. Flora Juan Fernand., 1896, p. 197.

Masatierra: Bahía Cumberland, in Wäldern (C. und I. SKOTTSBERG).

Masafuera: Heide oberhalb des Monotales, bei 850 m, fruchtend (C. und I. SKOTTSBERG).

Acarosporaceae.

Acarospora Mass.

A. Thallus fuscus — *A. smaragdula.*
B. Thallus flavus — *A. citrina.*

***A. smaragdula** Mass.

MASS., Ricerch. Auton. Lich., 1852, p. 29, fig. 47; A. L. SMITH, Monogr. Brit. Lich., vol. I, 1898, p. 336. — *Endocarpon smaragdulum* Wahlbg. apud ACH., Method. Lich., 1803, p. 29. — *Lecanora smaragdula* Nyl. in Flora, vol. LV, 1872, p. 429.

Masafuera: im untersten Teil der Quebrada de las Casas, auf vulkanischem Gestein häufig (C. und I. SKOTTSBERG).

*__A. citrina__ A. Zahlbr.

A. ZAHLBR. apud Rechinger in Denkschrft. Akad. Wiss. Wien, math.-naturw. Cl., vol. LXXXVIII, 1911, p 26. — *Urceolaria citrina* Tayl. in HOOK., London Journ. of Bot., vol. VI, 1847, p. 158. — *Lecanora xanthophana* Nyl. in Annal. Scienc. Nat., Bot., ser. 4. vol. XV, 1861, p. 379. — *Acarospora xanthophana* Jatta in Malpighia, vol. XX, 1906, p. 10; HUE in Nouv. Archiv. du Muséum, ser. 5, vol. I, 1909, p. 170.

Santa Clara: Morro de los Alelíes, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Pertusariaceae.

Pertusaria DC.

A. Sporae demum nigricantes, I violascentes; thallus lutescens, $CaCl_2O_2$ rubens; species saxicola *P. melanospora.*
B. Sporae persistenter decolores.
  a. Apothecia lecanorina, disco dilatato *P. Skottsbergii.*
  b. Apothecia pertusarioidea, disco punctiformi.
    I. Verrucae apotheciigerae bene evolutae.
      1. Verrucae apotheciigerae bullato-plicatae; species saxicola *P. hadrocarpa.*
      2. Verrucae apotheciigerae depresso-semiglobosae vel fere semiglobosae; species corticola *P. leioplaca* var. *turgida.*
    II. Verrucae apotheciigerae subindistinctae; species corticola *P. polycarpa* var. *monospora.*

*__P. leioplaca__ (Ach.) Schaer. var. __turgida__ Müll. Arg.

MÜLL. ARG. in Flora, vol. LXVII, 1884, p. 305; WAIN., Étud. Lich. Brésil, vol. I, 1890, p. 109.

Masafuera: Quebrada del Blindado, 440 m, auf Lumarinde (C. und I. SKOTTSBERG).

*__P. polycarpa__ Krph.

KRPH. in Flora, vol. LIX, 1876, p. 174; MÜLL. ARG. in Flora, vol. LXVII, 1884, p. 463; A. ZAHLBR. in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 154.

var. __monospora__ A. Zahlbr. nov. var.

Thallus substratum quasi membranaceum obducens, demum desquamans, tenuis, usque 0,2 mm altus, subtartareus, sat late effusus, pallide stramineus, nitidulus, KHO magis flavens, Ca Cl_2O_2 —, toruloso- vel verruculoso-inaequalis,

continuus, sorediis et isidiis destitutus, in ambitu nec bene limitatus nec linea obscuriore cinctus.

Verrucae apotheciigerae passim evolutae et deplanatae, in ambitu irregulares, passim omnino indistinctae; ostiola apotheciorum pluria, minuta, punctiformia, pallide vel obscurius cinerea, thallum non superantia, annulo thallo paulum pallidiore, utplurimum depresso circumdata; excipulum indistinctum; hymenium globosum, purum; paraphyses sat increbrae, filiformes, ramosae et connexae, eseptatae; asci ovali- vel ellipsoideo-clavati, recti vel subrecti, ad apicem rotundati et membrana primum crassa cincti, monospori; sporae decolores, simplices, ellipsoideae vel subovales, membrana duplici cinctae, membrana exteriore crassa et sublaevi, interna angusta et laevi, contentu oleoso, 90—100 μ longae et 40—44 μ latae.

Masafuera: Hochebene zwischen Quebrada Sanchez und Ensenada Toltén, 515 m, auf Baumstrünken (C. und I. SKOTTSBERG).

Als grundlegend für die Bestimmung wurde ein Urstück KREMPELHUBERS, welches im Herbar des Naturhistorischen Museums in Wien aufbewahrt wird, angenommen. Die Beschreibung, welche MÜLLER ARG. a. a. O. von der Flechte gibt, stimmt gut, mit Ausnahme der Sporenzahl, welche indes bei *Pertusarien* häufig wechselt und für den Typus der Art nicht sicher gestellt ist.

***P. hadrocarpa** A. Zahlbr. nov. spec.

Thallus epilithicus, subtartareus, tenuis, usque 0,8 mm crassus, sat late expansus, pallide stramineus, nitidulus, KHO flavens, $Ca\,Cl_2O_2$ —, KHO + $Ca\,Cl_2O_2$ —, verruculoso inaequalis vel verruculoso-subsquamulosus, verruculis convexis, passim plus minus deplanatis, parvis, 0,2—1 mm latis, continuis vel hinc inde etiam dispersis, in ambitu thalli subirregularibus, sorediis et isidiis destitutus, protothallo distincto nullo; stratum corticale tenue, 7—9 μ crassum, decolor; medulla alba, KHO flavens, $Ca\,Cl_2O_2$ non tincta, ex hyphis dense intricatis formata.

Verrucae apotheciigerae sessiles, dispersae vel hinc inde approximatae, depresso-subglobosae, 1—2 mm latae, ad basin constrictae, in ambitu sat irregulariter bullato-plicatae, ad verticem impressae et fuscescentes, 2—5 hymenia includentes, extus laeves; disci parvi, rotundati, demum confluentes, concavo-depressi, obscure et sordide fusci vel nigricantes, opaci; excipulum tenue, fere decolor, ex hyphis formatum tangentialibus, tenuibus et conglutinatis, integrum, passim versus centrum nuclei paulum assurgens, columellam et apothecia pseudocomposita formans; hymenium subglobosum omnino inspersum, superne sordide fuscescens, KHO dilute umbrino-violascens, usque 0,5 mm in diam., I solum asci intense violaceo-coerulei; paraphyses sat densae, filiformes, ramosae et convexae, eseptatae; asci oblongo-clavati, hymenio paulum breviores, recti, 6-spori; sporae in ascis subuniseriales, decolores, simplices, oblongo-ellipsoideae, rectae, membrana crassiuscula cincta, membrana exteriore et interiore laevi, KHO mm tinctae, 100 - 110 μ longae et 40—45 μ latae.

Conceptacula pycnoconidiorum immersa, extus vertice punctiformi, nigricante indicata, plus minus globosa; perifulcrium pallidum; fulcra exobasidialia,

ampullaceo-filiformes; pycnoconidia filiformi bacillaria, utrinque retusa, recta vel subrecta, 10—12(—16) μ longa et ad 0,7 μ lata.

Auf den vulkanischen Felsen häufig.

Masatierra: Pico Central; niederer Rücken östlich von der Kolonie, 147 m; Portezuelo de Villagra, 590 m; Felswand beim SELKIRK-Denkmal, 590 m; Cordón Salsipuedes, 465 m, Südhang der Tres Puntas (C. und I. SKOTTSBERG).

Masafuera: Quebrada de las Casas; Hochplateau bis auf den höchsten Gipfeln; La Lobería, 280 m (C. und I. SKOTTSBERG).

Nähert sich der *Pertusaria cerebrinula* A. Zahlbr., besitzt indes ein gut entwickeltes Lager, welches anders gefarbt ist, anders gestaltete Fruchtwarzen und grössere Sporen.

P. melanospora Nyl.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 30 (ubi descriptio ampla).

Vielleicht die häufigste der steinbewohnenden Krustenflechten von Juan Fernandez.

Masatierra: Bahía del Padre, auf Strandklippen und auf Lava; niederer Rücken am Südabhang der Tres Puntas und auf dem »Vogelgipfel», 380 m (C. und I. SKOTTSBERG).

Masafuera: Strandfelsen unweit des Monotals; im oberen Teil der Quebrada de las Vacas; Quebrada de las Casas, an Strandfelsen, meist oberhalb der Sturmzone (C. und I. SKOTTSBERG).

Santa Clara: Morro de los Alelíes (C. und I. SKOTTSBERG).

***P.** (sect. **Lecanorastrum**) **Skottsbergii** A. Zahlbr. nov. spec.

Thallus epiphloeodes, substrato arcte adhaerens, tenuis, 0,18—0,25 mm crassus, subtartareus, albus vel albidus. KHO non del vix tinctus, $Ca Cl_2O_2$ —, KHO + $Ca Cl_2O_2$ fugaciter quidem, sed distincte kermesino-rubens, late effusus, verrucolosus, toruloso-inaequalis, in ambitu longitudinaliter plicatus, hinc inde irregulariter fissus, sorediis et isidiis non praeditus, in margine linea obscuriore non cinctus, haud bene limitatus; stratum corticale angustum, ex hyphis intricatis formatum; stratum gonidiale angustum, continuum; medulla alba, ex hyphis intricatis et inspersis formata, KHO —, $Ca Cl_2O_2$ cinnabarina.

Apothecia lecanorina, sessilia, 0,5—0,9 mm lata, rotunda, dispersa, rarius approximata; discus carneo- vel rufo-fuscellus, primum albo-pruinosus, demum nudus, concaviusculus vel planus; margo albus, parum prominulus, tenuis, subinteger vel sublaceratus, $Ca Cl_2O_2$ rubens, extus corticatus, cortice tenui, ex hyphis dense intricatis et inspersus formato, gonidia increbra includens; excipulum distinctum haud evolutum; hymenium superne (et passim inter ascos) pulvere ochraceo-fusco, $Ca Cl_2O_2$ rubente inspersum, caeterum decolor, 240—260 μ altum, I intense coeruleo-violaceum; paraphyses sat increbrae et parum conspicuae, capillares, ramosae et plus minus connexae, eseptatae; asci hymenio subaequilongi, clavati, ad apicem rotundati et membrana primum incrassata cincti, recti vel curvuli, monospori; sporae decolores, anguste ellipsoideae, rectae,

rarius subrectae, simplices, contentu bene oleoso, membrana duplici cinctae, membrana externa laevi et membrana interna scalpturata, 170—220 μ longae et 45—80 μ latae.

Masatierra: Quebrada Gutierrez, auf glatter Baumrinde (C. und I. SKOTTSBERG).

Santa Clara: (C. und I. SKOTTSBERG).

Habituell einer *Lecanora chlarona* ähnlich. Die Fruchtwarzen gleichen jenen der *Pertusaria protoberans* vollkommen, doch ist die neue Art von dieser durch den dicken, weissen Thallus, die einsporigen Schläuche und durch die grossen Sporen wesentlich verschieden. Durch diese Merkmal wird sie auch von der nicht unähnlicher chilenischen *Pertusaria phlyctaenula* Nyl. getrennt.

Lecanoraceae.

Lecanora Ach.

Sect. **Aspicilia** (Mass.) Th. Fr.

***L. masafuerensis** A. Zahlbr. nov. spec.

Thallus epilithicus, effusus, tartareus, substratum arcte obducens, tenuis, albidus, pallide sulphureo- vel isabellino-albescens, opacus, KHO lutescens, $Ca\,Cl_2O_2$ —, laevigatus, subareolato-rimosus, rimis valde tenuibus, areolis minutis, planis, ad ambitum bene limitatus et linea obscuriore, tenui cinctus, sorediis et isidiis non praeditus.

Apothecia immersa, dispersa, rarius hinc inde approximata, rotunda vel rotundato-subirregularia, parva, 0,5—0,9 mm lata, e concavo planiuscula vel leviter convexa; margo thallinus distinctus nullus, a thallo circumscisse rupto hymenium circumdatur; discus ochraceo-fuscus vel fuscus, rarius aeruginascens, opacus, epruinosus; excipulum indistinctum; hymenium superne umbrino-fuscum, caeterum decolor et purum, usque 140 μ altum, I e coeruleo vinose obscuratum (ascis imprimis tinctis); paraphyses filiformes, conglutinatae, ad 1,5 μ crassae, simplices, eseptatae, ad apicem haud latiores; hypothecium crassiusculum, fere decolor, molle; asci clavati, ad apicem rotundati et membrana primum bene incrassata praediti, 8-spori; sporae in ascis bi-triseriales, decolores, simplices, ovales vel ovali-ellipsoideae, rectae, membrana tenui cinctae, 10—18 μ longae et 6—8 μ latae.

Conceptacula pycnoconidiorum punctiformia, vertice nigro et convexiusculo, globosa; perifulcrium dimidiatum, superne obscuratum; fulcra exobasidialia; pycnoconidia bacillaria, recta, rarius subrecta, 8,5—13 μ longa et vix 1 μ lata.

Masafuera: Quebrada de las Casas, bei 450 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Nahe verwandt der *Lecanora subimmersa* (Fée) Wain., aber durch die grösseren und blasseren Apothezien, grössere Sporen und geraden Pyknokonidien von dieser zu unterscheiden.

Sect. **Eulecanora** Wain.

A. Apothecia persitenter lecanorina; thallus Ca Cl_2O_2 —.
  a. Hymenium violaceo-cinnamomeum *L. atra.*
  b. Hymenium decolor.
    I. Thallus bene evolutus.
      1. Sporae minores, 8,6—10,5 μ longae *L. Ingae.*
      2. Sporae majores, 18—22 μ longae *L. isabellina* var. *validior.*
    II. Thallus evanescens vel subnullus.
      1. Margo apotheciorum albidus, crenulatus, persistens *L. dispersa.*
      2. Margo apotheciorum flavus, primum tenuis et integer, demum depressus *L. polytropa* var. *illusoria.*

B. Apothecia demum biatorina; thallus Ca Cl_2O_2 rubens *L. coarctata.*

***L. coarctata** (Sm.) Ach.

Masafuera: Heide des Hochplateaus, 1000—1200 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

***L. atra** (Huds.) Ach.

Masatierra: Bahía del Padre, an Strandfelsen, und Südhang der Tres Puntas, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Masafuera: Quebrada del Mono, an Strandfelsen; Quebrada de las Vacas, auf Blöcken, Heide auf dem Hochplateau, 1335 1350 m, auf vulkanischem Gestein, und Heide unweit Las Torres, auf Felsen (C. und I. SKOTTSBERG).

***L. Ingae** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, tenuis, albidus, opacus, KHO flavens, Ca Cl_2O_2 —, maculatim effusus, subgranulatus, areolato-rimosus, areolis minutis, 0,2—0,3 mm latis, planiusculis vel leviter convexis, hinc inde, imprimis versus ambitum thalli, subsquamiformibus, sorediis et isidiis non praeditus, protothallo obscuriore non cinctus; superne strato corticali, ex hyphis dense intricatis et inspersis formato obductus; pagina inferior thalli infuscata vel fere nigrescens; stratum gonidiale continuum, partem superiorem thalli occupans; medulla alba, KHO —, Ca Cl_2O_2 —, angusta.

Apothecia lecanorina, sessilia, ad basin leviter constricta, rotunda vel rotundato subangulosa, dispersa vel approximata, usque 1 mm lata, sed normaliter minora; discus caesio-pruinosus, madefactus plus minus fuscus vel rufo-fuscus, e concavo subplanus, margo thallinus primum bene prominulus, integer, demum subinteger, crassiusculus, thallo concolor, extus corticatus, cortice ex hyphis intricatis, inspersis formato, ad ambitum fuscescente, 33—37 μ crasso, gonidia copiosa includens; excipulum integrum, ad basin subpedicellato-productum,

usque ad verticem hymenii assurgens, subdecolor et fere pellucidum, ex hyphis tangentialibus, tenuissimis et leviter intricatis formatum, 30—35 μ crassum, I —; hypothecium angustum, subdecolor (dilute lutescens), molle; hymenium superne dilute umbrino-fuscescens et inspersum, caeterum decolor et purum, 80—90 μ altum, I e coeruleo aeruginoso-sordidescens (imprimis asci); paraphyses filiformes, conglutinatae, simplices, eseptatae, ad apicem haud crassiores; asci oblongo-clavati, ad apicem rotundati, hymenio subaequilongi, 8-spori; sporae in ascis plus minus biseriales, decolores, simplices, ellipsoideae, membrana tenui laevique cinctae, 8,6—10,5 μ longae et 3,5—4 μ latae.

Conceptacula pycnoconidiorum semiemersa, vertice punctiformi, nigro, a thallo annulatim cincto, plus minus globosa; perifulcrium in dimidio superiore sordide fuscum; fulcra exobasidialia, pycnoconidiis paulum breviora; pycnoconidia filiformia, utrinque retusa, curvata vel hamata, 15—18 μ longa et vix 1 μ lata.

Masatierra: Bahía del Padre, an Strandfelsen (C. und I. SKOTTSBERG).

Masafuera: Quebrada de las Casas, auf Blöcken (C. und I. SKOTTSBERG).

***L. albellina** Müll. Arg.

MÜLL. ARG. in Mission. Scient. Cap Horn, vol. V, 1889, p. 162.

var. **validior** A. Zahlbr. nov. var.

Apotheciis majoribus et margine thallino apotheciorum primum distincte crenulato a typo differt.

Apothecia sessilia, rotunda, primum distincte lecanorina, dein usque 1,2 mm lata et margine depresso habitum biatorinum praebentia, leviter convexa; discus fuscidulo-carneus vel alutaceus, non pruinosus; margo thallinus primum bene prominulus, angustus, obtusiusculus, primum crenulatus, thallo concolor, extus strato corticali obductus, medullam et gonidia includens; excipulum integrum, ad latera hymenii crassius, decolor, ex hyphis tangentialibus et conglutinatis formatum; hypothecium crassiusculum, dilute lutescens, ex hyphis intricatis formatum; hymenium superne rufescenti-fuscescens, non inspersum, caeterum decolor et purum, aquoso pellucidum, 150—175 μ altum, I intense coeruleum et demum sordide obscuratum; paraphyses filiformes, dense conglutinatae, simplices, eseptatae, ad apicem vix latiores; asci clavati, superne rotundati et membrana incrassata cincti, 8 spori; sporae in ascis bi- vel subuniseriales, decolores, simplices, late ellipsoideae vel ovales, membrana tenui, sed bene distincta cinctae, 18—22 μ longae et 10—13 μ latae.

Masafuera: Quebrada del Blindado, 440 m, auf *Dendroseris gigantea* (C. und I. SKOTTSBERG).

***L. dispersa** (Pers.) Flk.

Masatierra: Bahía del Padre, auf losem Tuff; Südseite der Insel, Gipfel des Cerro Negro, 190 m, auf vulkanischem Gestein (C. und I SKOTTSBERG).

Masafuera: Strandfelsen, Quebrada de las Casas (C. und I SKOTTSBERG).

*L. **polytropa** (Ehrh.) Ach. f. **illusoria** Ach.

Masafuera: Heide unweit Las Torres, 1350 m, auf vulkanischem Gestein und unweit des Correspondencialagers, 1100—1200 m, auf Steinen (C. und I. SKOTTSBERG).

Sect. **Placodium** (Hill.) Th. Fr.

A. Thallus plus minus peltatus; apothecia nigra vel nigricantia *L. chrysoleuca* var. *melanophthalma.*
B. Thallus lata adpressus, apothecia pallescentia *L. saxicola.*

*L. **chrysoleuca** (Sm.) Ach. var. **melanopthalma** (Ram.) Th. Fr.

Masatierra: Felsblöcke Quebrada Juanango, bei 500 m, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

*L. **saxicola** (Poll.) Ach.

Masatierra: Puerto Ingles, an der Aussenwand der s. g. »Robinsonhöhle», auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Sect. **Placopsis** Nyl.

A. Apothecia non rosea; pycnoconidia 20—24 μ. longa.
   a. Apothecia carneo- vel rufo-fusca; cephalodia granuloso-verrucosa, rufofusca vel sordide fuscescentia *L. gelida.*
   b. Apothecia cerasino-fusca; cephalodia radiatim divisa, lutoso-aurantiaca *L. patagonica.*
B. Apothecia rosea; pycnoconidia 25—28 μ. longa *L. argillacea* var. *rhodophthalma.*

L. gelida (L.) Ach.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 35. — *Parmelia gelida* Fr., Nov. Sched. Critic., 1827, p. 1; MONT. apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 147; JOHOW, Estud. Flora Juan Fernand., 1896, p. 200. — *Biatora placophylla* Mont. in Annal. Scienc. Nat. Bot., ser. 2, vol. IV, 1825, p. 92 (non Fr.).

*f. **nuda** A. Zahlbr. nov. f.

Thallus non sorediosus.

Masatierra: auf Felsen und auf der Erde, ohne nähere Standortsangabe (BERTERO); auf Lavasteinen in dem Grasboden bei Villagra (C. und I. SKOTTSBERG).

Masafuera: Bachravin unweit des Campo Correspondencia, 1100 m, auf Steinen (C. und I. SKOTTSBERG).

*f. **leprosula** A. Zahlbr. nov. f.

Thallus plus minus impresse leproso-sorediosus.

Masatierra: an Blöcken im unteren Teil von Valle Colonial und an steinigen Abhängen südlich von Tres Puntas (C. und I. SKOTTSBERG).

***L. argillacea** Nyl. f. **rhodophthalma** A. Zahlbr.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 34. — *Lecanora rhodophthalma* Müll. Arg. in Flora, vol. LXII, 1879, p. 164.

Masatierra: auf stark erodiertem Boden im unteren Teil von Valle Colonial (C. und I. SKOTTSBERG).

L. patagonica A. Zahlbr.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 35.

*f. **sorediosula** A. Zahlbr. nov. f.

Thallus passim impresse leproso-sorediosus.

Masafuera: Hochplateau nördlich des Casastales, 1000—1400 m, auf Steinen häufig, und auf einer Felswand bei Las Torres, 1370 m (C. und I. SKOTTSBERG).

Candelariella Müll. Arg.

***C. vitellina** Müll. Arg.

MÜLL. ARG. in Bull. Herb. Boiss., vol. II, append. 1, 1894, p. 47. — *Lichen vitellinus* Ehrh., Plant. Crypt. Exsicc. no. 155 (1785).

Masatierra: Quebrada de la Pesca de los Viejos, auf harten Blöcken (C. und I. SKOTTSBERG).

Masafuera: im untersten Teil der Quebrada de las Casas, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Myxodictyon Mass.

A. Schläuche einsporig, auf Rinden lebende Art *M. chrysostictum.*
B. Schläuche 8-sporig, auf lederigen Baumblättern lebende Art *M. lopadioides.*

M. chrysostictum Mass.

Mass. in Atti I. R. Istit. Venet., ser. 3, vol. V, 1860, p. 245. — *Lecanora chrysosticta* Tayl. in London Journ. of Bot., vol. III, 1844, p. 642. — *Heterothecium Berteroanum* Mont. apud Gay, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 176, tab. XII, fig. 5; Johow, Estud. Flora Juan Fernand., 1896, p. 201.

Masatierra: auf Rinden (Bertero).

*M. lopadioides A. Zahlbr. nov. spec.

Thallus epiphyllus, crustaceus, uniformis, tenuis, 0,5 – 0,6 mm altus, glaucescenti-albidus, nitidulus, KHO —, $Ca\,Cl_2O_2$ —, continuus vel fissuris substratum sequentibus passim interruptus, leviter inaequalis vel marginem versus granuloso-inaequalis, sorediis et isidiis destitutus, passim linea tenui nigra cinctus, superne strato corticali tenui, subamorpho tectus, caeterum fere homoeomericus; gonidia cystococcoidea, globosa, laete viridia, 5—8 μ in diam.

Apothecia sessilia, parva, usque 1 mm lata, rotunda, ad basin leviter constricta, dispersa vel approximata; discus e concaviusculo subplanus, cinnamomeo-fuscus vel rufescens, epruinosus; margo disco obscurior, superne fere nigricans, tenuis, acutiusculus, prominulus et leviter inflexus; receptaculum extus pallidum, albidum, opacum, corticatum, cortice crasso, decolore, chondroideo, ex hyphis radiantibus, parum distinctis et septatis formato, paraplectenchymatico, medullam et gonidia includens; excipulum integrum, fere decolor, in latere hymenii flabellatum, ex hyphis dense conglutinatis, tangentialibus formatum; hypothecium pallidum, molle, ex hyphis intricatis formatum; epithecium chondroideum, rufescens vel ochraceo-rufescens, KHO haud mutatum; hymenium decolor, pulverulento-inspersum, I asci coerulei; paraphyses capillares, simplices, eseptatae, ad apicem vix crassiores, contextae; asci numerosi, hymenio subaequilongi, ellipsoideo-clavati, superne rotundati et ibidem membrana bene incrassata cincti, 8-spori; sporae decolores, ellipsoideae oblongo-vel ovali-ellipsoideae, rectae, versus centrum nonnihil leviter angustatae, muralidivisae, cellulis numerosis, minutis, subcubicis, membrana tenui cinctis, halone non praeditae, 80—98 μ longae et 28—35 μ latae.

Pycnoconidia non visa.

Masatierra: auf lederigen Blättern (C. und I. Skottsberg).

Die Apothezien besitzen einen typischen lekanorinischen Bau, obwohl sie äusserlich wegen des nicht hellen Randes den Eindruck eines biatorinischen Apotheziums machen.

Parmeliaceae.

Parmelia (Ach.) DNotrs.

A. Thallus subtus rhizinis omnino destitutus, pertusus — *P. pertusa.*
B. Thallus subtus plus minus rhizinosus.
   a. Thallus flavus vel stramineus.

I. Thallus inferne ad ambitum late nudus, centrum versus plus minus rhizinosus.
1. Medulla Ca Cl_2O_2 —; soredia superficialia *P. caperata.*
2. Medulla Ca Cl_2O_2 optime rubens; soredia marginalia *P. soredica.*

II. Thallus usque ad ambitum dense rhizinosus.
1. Margo apotheciorum conceptaculis pycnoconidiorum nigris obsitus; thallus tenuissime isidiosulus *P. abstrusa.*
2. Margo apotheciorum conceptaculis pycnoconidiorum destitutus; thallus non isidiosulus.
α. Thallus rugulosus et sorediosus *P. conspersa* var. *rugulosa.*
β. Thallus non rugulosus, sorediosus *P. conspersa* var. *obtecta.*

b. Thallus albidus, cinereus vel subochraceo cinereus.
I. Thallus subtus ad ambitum late nudus.
°. Thallus superne punctis albis obsitus.
1. Thallus scrobiculatus vel scrobiculato-inaequalis; puncta alba prominula *E. microsticta.*
2. Thallus laevigatus; puncta alba impressa *P. cetrarioides.*
°°. Thallus superne punctis albis non ornatus.
1. Thallus in superficie plus minus isidiosus, isidia cilias nigras, rigidulas intermixtas gerentia *P. pilosella.*
2. Thallus in superficie non isidiosus.
α. Thallus ad marginem loborum sorediosus vel isidioso-sorediosus; medulla KHO flavens.
§. Thallus superne versus marginem passim ciliis nigris, arcte adpressis obsitus *P. piloselloides.*
§§. Thallus superne non ciliigerus *P. perlata.*
β. Lobi thalli ad marginem non sorediosi; medulla KHO non tincta *P. nilgherrensis.*

II. Thallus subtus usque ad ambitum dense rhizinosus.
1. Lobi thalli lineares vel sublineares.
α. Thallus superne dense isidiosus *P. laevigatula.*
β. Thallus superne non isidiosus, sed sorediosus.
§. Lobi terminales revoluti *P. revoluta.*
§§. Lobi thalli omnes substrato adpressi *P. laevigata.*
2. Lobi thalli rotundati.
α. Medulla KHO non tincta *P. tiliacea.*
β. Medulla KHO sanguinea.
§. Thallus superne tenuiter albo-reticulatus *P. cetrata.*
§§. Thallus non albo-reticulatus *P. saxatilis.*

Sect. **Hypotrachyna** Wain.

*P. **laevigata** Ach.

Ach. Synops. Lich., 1814, p. 212; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. I, 1899, p. 146 et in Journ. de Botan., vol. VI, 1892, p. 490; A. Zahlbr. in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 166; A. L. Smith, Monogr. Brit. Lich., vol. I, 1918, p. 137; Wain. in Annal. Acad. Scient. Fennic., ser. A, vol. VI, no. 7, 1915, p. 23 — *Lichen laevigatus* Sm. apud Sm. et Sowerb., Engl. Bot., vol. XXV, 1808, tab. 1852.

Masatierra: Quebrada seca, 435 m, auf *Coprosma triflorum,* steril (C. und I. Skottsberg).

*P. **laevigatula** Nyl.

Nyl. in Flora, vol. LXVIII, 1885, p. 614, Lich. Japon., 1890, p. 27; Hue in Nouv. Archiv. du Muséum, ser. 3, vol. II, 1890, p. 286 et vol. IV, 1892, p. 144; A. Zahlbr. in Denkschr. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 165.

Masatierra: Cordón Chifladores, 350 m, auf *Drimys,* und Portezuelo, bei 600 m, über Moosen, steril (C. und I. Skottsberg).

Im sterilen Zustande ganz mit der brasilianischen Flechte übereinstimmend. Ob bezüglich der Sporen und Pyknokonidien Unterschiede vorhanden sind, muss dahingestellt bleiben.

P. **tiliacea** Ach.

Ohne Standortsangabe (nach Nyl., Synops. Lich., vol. I, 1860, p. 383).

Ich sah diese Flechte in dem Skottsberg'schen Material nicht und möchte ihr Vorkommen auf Juan Fernandez bezweifeln.

*P. **revoluta** Flk.

Flk. apud Sprgl., Syst. Veget., vol. IV, pars 1, 1827, p. 284; Wain., Étud. Lich. Brésil, vol. I, 1890, p. 51; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. I, 1899, p. 143; A. L. Smith, Monogr. Brit. Lich., vol. I, 1918, p. 138.

Masafuera: El Barril und Los Inocentes, bei 900 m, auf *Drimys*-Zweigen, steril (C. und I. Skottsberg).

*P. **cetrata** Ach. f. **sorediifera** Wain.

Wain., Étud. Lich. Brésil, vol. I, 1890, p. 40 et in Annal. Acad. Scient. Fennic., ser. A, vol. VI, no. 7, 1915, p. 16; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. I, 1899, p. 174; Harm., Lich. de France, vol. IV, (1909) 1910, p. 569.

Masatierra: Cordón Chifladores, 350 m, auf *Drimys*-Rinde, steril und auf dem niedrigen Rücken östlich der Kolonie, 147 m, auf Pflanzenresten, losen Steinen und auf dem Erdboden, steril (C. und I. Skottsberg).

Santa Clara: Morro de los Alelíes, auf Steinen steril (C. und I. SKOTTSBERG).

Masafuera: auf dem Bergrücken El Barril, auf Steinen, steril, und Quebrada de la Lobería, 300 m, auf alter *Luma*-Rinde, steril (C. und I. SKOTTSBERG).

*P. **saxatilis** (L.) Ach.

Masatierra: niedriger Rücken östlich von der Kolonie, 147 m, auf losen Steinen (C. und I. SKOTTSBERG).

f. **furfuracea** Schaer.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 41.

Masafuera: Campo Correspondencia, 1130 m, auf Gestein, steril; Las Torres, 1350 m, auf dem Erdboden, steril; Cordón del Barril, im obersten Teile der Heide, auf Steinen, steril (C. und I. SKOTTSBERG).

P. conspersa (Erh.) Ach.

var. **rugulosa** Müll. Arg.

MÜLL. ARG. in Miss. Scient. Cap Horn, vol. V, 1889, p. 158; A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 43.

An manchen Stücken findet man neben den normal gestalteten auch tief eingeschnittene Randlappen; diese Stücke weichen dann habituell etwas ab.

Masatierra: auf einem Felsblock zwischen der Kolonie und Pangal, steril; Bahía del Padre, auf Strandfelsen, steril (C. und I. SKOTTSBERG).

Santa Clara: Morro de los Alelíes, auf Strandfelsen (C. und I. SKOTTSBERG).

*var. **obtecta** A. Zahlbr. nov. var.

Thallus sorediosus, sorediis subrotundatis, sessilibus, pulviniformibus, subisidioso-pulverulentis, thallo concoloribus; medulla KHO sanguinea.

Die Gestalt der Soredien weicht von denen der *Parmelia conspersa* var. *soredians* Nyl. ab, auch sind sie anders gefärbt; von *Parmelia conspersa* var. *rugulosa* Müll. Arg. weicht unsere Varietät durch das nicht faltige Lager und die Färbung der Markschicht durch Kalilauge (bei der var. *rugulosa* wird sie orangegelb gefärbt) ab.

Masafuera: Quebrada de las Casas, auf Strandfelsen, und Cordón del Barril, im obersten Teile der Heide, auf Steinen häufig, doch stets steril (C. und I. SKOTTSBERG).

*P. **abstrusa** Wain.

WAIN., Étud. Lich. Brésil, vol. I, 1890, p. 64; A. ZAHLBR. in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 166; LYNGE in Arkiv

för Bot., vol. XIII, no. 13, 1914, p. 145, tab. V, fig. 8—9. — *Parmelia limbata* f. *isidiosa* Müll. Arg. in Flora, vol. LXX, 1887, p. 59.

Masafuera: alpine Heide der Hochebene, 1000—1300 m, auf Felsen, steril (C. und I. SKOTTSBERG).

Sect. **Amphigymnia** Wain.

*P. perlata Ach.

ACH., Method. Lich., 1803, p. 216 (pr. p.); WAIN, Étud. Lich. Brésil, vol. I, 1890, p. 28 et in Philipp. Journ. of Scienc., vol. IV, 1909, p. 657.

Masatierra: Puerto Frances, Loma Incienso, auf Felsen, steril und bei Villagra, 380 m, auf Felsen, steril (C. und I. SKOTTSBERG).

*P. nilgherrensis Nyl.

NYL. in Flora, vol. LII, 1869, p. 291 et Lich. Pyren. Orient., 1891, p. 40; HUE in Journ. de Bot., vol. XII, 1898, p. 244; WAIN. in Hedwigia, vol. XXXVII, 1898, p. (37); HARM., Lich. de France, fasc. IV, (1909) 1910, p. 578. — *Imbricaria nilgherrensis* Arn. in Verhandl. zool.-bot. Gesellsch. Wien, vol. XXV, 1875, p. 472 et in Flora, vol. LXVII, 1884, p. 159.

Masafuera: Quebrada del Blindado, 440 m, auf *Luma*-Zweigen, steril (C. und I. SKOTTSBERG).

*P. pilosella Hue.

HUE in Journ. de Bot., vol. XII, 1898, p. 247; HARM., Lich. de France, fasc. IV, (1909) 1910, p. 583; B. de Lesd., Lich. Mexique, 1914, p. 7.

Masatierra: Abhänge bei Portezuelo, 575 m, auf der Erde, steril (C. und I. SKOTTSBERG).

*var. excrescens Hue.

HUE in Journ. de Bot., vol. XII, 1898, p. 249; HARM., Lich. de France, fasc. IV, (1909) 1910, p. 583; LETTAU in Hedwigia, vol. LV, 1914, p. 48. — *Imbricaria perlata* var. *excrescens* Arn. in Flora, vol. LXV, 1882, p. 130 et Zur Lich.-Flora München, 1892, p. 5. — *Parmelia perlata* var. *excrescens* Lamy in Bull. Soc. Bot. France, vol. XXV, 1878, p. 367.

Masatierra: Portezuelo, bei 600 m, auf Baumstämmen, steril; am Wege von Portezuelo nach Villagra, 420 m, an lichten Stellen im Gebüsch, steril; El Pico, 365 m, auf Blöcken, steril (C. und I. SKOTTSBERG).

Masafuera: auf der Hochebene über Chozas, 900—1000 m, steril und Cordón del Barril, auf *Drimys*-Stämmen, steril (C. und I. SKOTTSBERG).

P. piloselloides A. Zahlbr.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 431.

Masatierra: Bahía Cumberland, auf Felsen (C. SKOTTSBERG).

*P. cetrarioides Del.

Del. apud Duby, Botanic. Gallic., vol. II, 1830, p. 601; Hue in Nouv. Archiv. du Muséum, ser. 4, vol. I, 1899, p. 196; Harm. in Bull. Soc. Scienc. Nancy, ser. 2, vol. XXXI, 1897, p. 322, tab. XI, fig. 17 et Lich. de France, fasc. IV, (1909) 1910, p. 530.

Masafuera: Quebrada del Blindado, 440 m, auf *Luma*-Zweigen, steril (C. und I. Skottsberg).

*P. microsticta Müll. Arg.

Müll. Arg. in Flora, vol. LXII, 1879, p. 164; A. Zahlbr. in Bull. Herb. Boissier, ser. 2, vol. VIII, 1908, p. 463 et in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 160 et 177, tab. I, fig. 3; Lynge in Arkiv för Bot., vol. XIII, no. 13, 1914, p. 24 et 32. — *Parmelia Borreri* var. *ulophylla* Krph. in Flora, vol. LXI, 1878, p. 433.

Masatierra: auf losen Steinen und auf der Erde östlich von der Kolonie, 147 m, steril (C. und I. Skottsberg).

*f. divisa A. Zahlbr. nov. f.

Thalli lobi, imprimis centrales, ad marginem microphyllino-dissecti.

Masatierra: Quebrada seca, 435 m, auf *Coprosma triflorum*, steril (C. und I. Skottsberg).

*P. caperata (L.) Ach.

Masatierra: Pangal, auf Felsen, steril; Valle Anson, auf Felsen des sonnigen Rückens, 149 m, steril; niedriger Rücken östlich der Kolonie, 147 m, steril; Puerto Ingles, Aussenwand der Robinsonhöhle, steril; Portezuelo del Villagra, 590 m, auf Gestein, steril (C. und I. Skottsberg).

Masafuera: Quebrada de las Casas, auf Felsen am Bache, steril (C. und I. Skottsberg).

Alle Stücke zeigen ein lebhaft gelb gefärbtes Lager, während bei den europäischen Exemplaren das Gelb einen Stich ins Grünliche besitzt. Ganz ähnlich gefärbt sah ich die zahlreichen Exemplare dieser Flechte, welche von Faurie und Rock auf den hawaiischen Inseln gesammelt wurden. Ich meine, dass diese intensivere Färbung lediglich ein Ausfluss der stärkeren Besonnung ist.

P. soredica Nyl.

Nyl. in Bull. Soc. Linn. Normand., ser. 2, vol. VI, 1872, p. 316, not, in Flora, vol. LXVIII, 1885, p. 605 et vol. LXIX, 1886, p. 101; Herre in Proceed. Washingt. Acad. Scienc., vol. VII, 1906, p. 358; B. de Lesd., Lich. Mexique, 1914, p. 6.

Exsicc.: Krypt. Exsicc. Mus. Palat. Vindob. no. 1250.

Masafuera: Quebrada de las Chozas, auf *Luma*-Rinde, steril (C. und I. SKOTTSBERG).

Stimmt mit den kalifornischen Stücken vollkommen überein. Das Vorkommen in Mexico und auf Juan Fernandez weist auf eine weitere Verbreitung dieser Flechte in Amerika hin.

Sect. **Menegazzia** (Mass.) A. Zahlbr.

***P. pertusa** (Schrank.) Schaer.

Masatierra: Quebrada seca, 435 m, auf einer *Juania*, steril und Quebrada Juanango, auf Baumstämmen und Zweigen, steril (C. und I. SKOTTSBERG).

Masafuera: Cordón del Barril, auf *Drimys*-Stämmen, steril (C. und I. SKOTTSBERG).

Cetraria Ach.

***C. antarctica** A. Zahlbr. — Taf. 25, Fig. 5.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 43.

Conceptacula pycnoconidiorum marginalia, sessilia, globosa, nigra, nitida, 0,3—0,5 mm lata, dispersa vel passim confluentia; perifulcrium tenue, carbonaceum; pycnoconidia oblonga, utrinque rotundata, in medio leviter angustata, recta, 3,4—3,6 μ longa et 1,5—1,6 μ lata.

Masatierra: Portezuelo, 600 m und zwischen Portezuelo und Villagra, 420 m, an lichten Stellen auf dem Erdboden, steril (C. und I. SKOTTSBERG).

Masafuera: Cordón del Barril, auf Moosen und zwischen anderen Flechten auf Gestein und Las Torres, 1350 m, über Moosen, steril (C. und I. SKOTTSBERG).

Ramalina Ach.

R. linearis Ach.

ACH., Lichenogr. Univ., 1810, p. 598 et Synops. Lich., 1814, p. 294; NYL. in Bull. Soc. Linn. Normand., ser. 2, vol. IV, 1870, p. 129; TUCK., Synops. North Americ. Lich., vol. I, 1882, p. 23; HOWE JR. in Bryologist, vol. XVII, 1914, p. 25, fig. 6 et tab. VI, fig. 4. — *Lichen linearis* Sw., Method. Muscor., 1781, p. 36, tab. II, fig. 3. — *Ramalina pilulifera* Tayl. in London Journ. of Bot., vol. IV, 1847, p. 190; MÜLL. ARG. in Flora, vol LXXI, 1888, p. 135. — *Ramalina scopulorum* var. *linearis* Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 86. — *Ramalina subulata* Mont. in Annal Scienc. Nat., Bot., ser. 3, vol. XVIII, 1852, p. 304 et apud GAY, Hist. Fisic. y Polit. Chile, Bot., vol. VIII, 1852, p. 82; JOHOW, Estud. Flora Juan Fernand., 1896, p. 197.

Thallus gompho rotundato vel rotundato-oblongo substrato arcte affixus, caespitose crescens, pallidus, stramineo-glaucescens vel supra basin plus minus

fuscescens, nitidulus, rigidus, primum e basi ramosus, rami erecti, complanati, leviter canaliculati, lineares, 1—2 mm lati, usque 10 cm alti, simplices vel increbre dichotome et sympodialiter divisi, rami secundarii plus minus filiformes, utplurimum flabellati et magis patentes, rami ultimi flexuosi et hamati, plus minus divaricantes, omnes striis brevibus obsiti vel longitudinaliter striato-nervosi, rami primarii vel partim etiam secundarii demum decumbentes vel subintricati, dilatati, 5—22 mm lati, ramis filiformibus evanescentibus et dein habitum alienum praebentes, sorediis et isidiis nullis; KHO extus et intus non tingitur; circumcirca corticatus, cortex chondroideus, angustus, 8,5—11 μ crassus, dense fuscescenti-inspersus, ex hyphis subintricatis, extus plus minus perpendicularibus, sat pachydermaticis, increbre ramosis formatus, luminibus hyphorum subindistinctis; stratum chondroideum medullare simplex (non fasciato-divisum), crassum; hinc inde fere totam latidudinem thalli occupans; decolor, ex hyphis longitudinalibus, subflexuosis, dense conglutinatis, non inspersis et pellucidis formatum; medulla angusta, versus marginem thalli ramos breves et angustos, corticem interrumpentes et usque ad superficiem thalli productos format, hyphae medullares laxe contextae, ramosae, sat leptodermaticae, ad 3,5 μ crassae; gonidia cystococcoidea, globosa, laete viridia, 6—12 μ lata, plus minus glomerata.

Apothecia sat crebra, normaliter marginalia, rare superficialia, subpedicellata, primum concaviuscula, margine integro et paulum prominulo cincta, demum convexa, 1—2 mm lata, rarius fere semiglobosa, vetusta et morbosa prolificantia, botryoso-congesta, subglobosa, ad 4 mm lata; discus pallide ceraceo-testaceus, in juventute prominulus; receptaculum extus thallo concolor, nudum, laeve, late corticatum, cortice chondroideo, ad ambitum anguste fuscescente et insperso, caeterum decolore, intus medullam et infra hymenium stratum gonidiale includens; excipulum integrum, decolor, ex hyphis tenuibus, tangentialibus, dense contextis formatum, sat crassum, I —; hypothecium angustum, ex hyphis intricatis formatum, decolor; hymenium superne anguste et leviter sordide inspersum, caeterum decolor et purum, 70—80 μ altum, I intense coeruleum, demum aeruginoso-obscuratum; paraphyses filiformes, strictae, conglutinatae, simplices, eseptatae, ad apicem non latiores; asci hymenio subaequilongi, clavati, ad apicem rotundati et membrana incrassata cincti, 8-spori; sporae in ascis ± biseriales, decolores, ellipsoideae vel subovali-ellipsoideae, rectae, rarius spurie curvulae, uniseptatae, ad septum nonnihil levissime constrictae, 6—15 μ longae et 5—6 μ latae.

Masatierra: auf Felsen in den höheren Bergen (BERTERO no. 1642); Portezuelo, beim SELKIRK-Denkmal, 590 m; Cordón Salsipuedes, 465—600 m; auf dem Rücken zwischen Villagra und Chupones, 386 m, äusserst häufig; Bahía del Padre, auf Strandfelsen (C. und I. SKOTTSBERG).

Eine flüchtige Durchsicht des umfangreichen SKOTTSBERG'schen Materials dieser Art macht den Eindruck, als ob zwei Arten oder Varietäten, eine mit schmalen, die andere mit bisweilen sehr breiten Lappen gesellig neben- und durcheinander wachsen würden. Ein genaues Zusehen und der anatomische Vergleich der Lappen zeigt indes, dass es sich hier nur um Alters- oder Entwicklungsstufen einer und derselben Art handelt. So verschiedenartig auch die Individuen aussehen, so ist es doch nicht möglich, die beiden Wachs-

tumarten als verschiedene Formen zu bezeichnen und zu trennen, denn es gibt Individuen, welche beide Lappenformen zeigen. Die Beschreibung, welche die Autoren bisher von der Flechte geben, passt nur auf die schmalen Lappen. Das geht klar hervor aus einem Exemplar, welches von BERTERO gesammelt, von MONTAGNE als »*Ramalina scopulorum* var. *linearis*» bestimmt, im Herbar des botanischen Museums in Upsala liegt und das ich dort zu studieren Gelegenheit hatte. Die Verhältnisse liegen hier gerade so als bei *Ramalina fraxinea*, dessen breitlappige Formen als f. *ampliata* bezeichnet werden, obwohl sie keine eigentliche Abänderung der Art darstellen.

***R. Usnea** Howe jr.

HOWE JR. in Bryologist, vol. XVII, 1914, p. 81, fig. 1, tab. XII, fig. 1—2. — *Lichen Usnea* Linn., Mantissa I, 1767, p. 131. — *Parmelia usneoides* Ach., Method. Lich., 1803, p. 270. — *Ramalina usneoides* Mont. apud GAUDICH., Voyage Bonite, 1844—46, p. 156; Nyl., Synops. Lich., vol. I, 1860, p. 291.

Masafuera: Hochplateau zwischen Sanchez und Toltén, 515 m, auf Bäumen, steril (C. und I. SKOTTSBERG).

[Folgende Arten sind zu streichen:

R. ceruchis De Not. (*Usnea ceruchis* Mont. in Annal. Sci. Nat., Bot., vol. II, 1834, tab. XVI, fig. 1; ser. 2, Vol, IV, 1835, p. 86). »Crescit ad ramos *Adesmiæ microphyllæ* in consortio *U. ceratinæ* et *Ramalinæ fraxineæ;* MONT. l. c. p. 86. BERTERO no. 1783.

R. fraxinea! var. *membranacea?* MONT. l. c. p. 86:

»Crescit ad ramos *Adesmiæ microphyllæ* confinis Usneis *ceratinæ* et *Ceruchi*». In GAY, Hist. Fisic. y Polit. Chile, Bot. vol. VIII, 1852, p. 81 zitiert MONTAGNE dasselbe Exemplar unter *R. fraxinea* (Mont. non. Ach.; nach NYLANDER, Bull. Soc. Linn. Normand., ser. 2, vol. IV, 1870, p. 139 = *R. subfraxinea* Nyl.). In Estud. Flora J. Fern., 1896, p. 197 zitiert JOHOW *R. calicaris* v. *fraxinea* als gesammelt von BERTERO und JOHOW; BERTERO's Exemplare sind zu streichen; JOHOW's gehören höchstwahrscheinlich zu *R. linearis.*

Obschon oben erwähnte Arten in MONTAGNE's »Prodomus Florae Fernandezianae» aufgenommen wurden, ja in GAY l. c. eben für Juan Fernandez angegeben werden, hat sie BERTERO aber, wie mir Prof. SKOTTSBERG mitteilt, nicht auf Juan Fernandez gesammelt. Sie sollen nämlich auf *Adesmia microphylla* gewachsen haben, und weder diese noch eine andere *Adesmia*-Art kommt auf den Inseln vor. Dagegen ist die fragliche *Adesmia* in Zentral-Chile, wo wohl jene Flechten gesammelt wurden, gar nicht selten.]

Usnea Wigg.

A. Thalli rami teretes.
  a. Axis solida $^1/_4$—$^1/_5$ crassitudinis ramorum occupans
    U. Steineri var. *torulosa.*
  b. Axis solida ± $^1/_3$ crassitudinis thalli occupans.
    I. Thallus erectus, fruticulosus *U. florida* var. *chrysopoga.*
    II. Thallus pendulus, elongatus
      U. dasypoga var. *plicata*, f. *dasypogoides.*
B. Thalli rami angulosi *U. angulata.*

U. dasypoga (Ach.) Nyl. var. **plicata** (Hoffm.) Hue f. **dasypogoides** A. Zahlbr.

A. Zahlbr. in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 185. — *Usnea dasypogoides* Nyl. apud Cromb. in Journ. of Bot., vol. XIV, 1876, p. 263. — *Usnea straminea* Müll. Arg. in Flora, vol. LXII, 1879, p. 162. — *Usnea Schadenbergiana* Goepp. et Stein in 60. Jahresb. Schlesisch. Gesellsch, für vaterl. Kultur, 1883, p. 229. — *Usnea dasypoga* f. *dasypogoides* Hue in Nouv. Archiv. du Muséum, ser. 4, vol. I, 1899, p. 47; A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 44.

Masatierra: Puerto Frances, auf *Myrceugenia fernandeziana,* steril; Cordón Chifladores, 350 m, auf *Drimys,* steril; Valle Colonial, Cordón Central, 577 m, auf Rinden, steril; Portezuelo, 575 m, steril (C. und I. Skottsberg).

Masafuera: Quebrada del Mono, 700 m, auf *Myrceugenia Schulzei,* steril (C. und I. Skottsberg).

U. florida (L.) Hoffm. var. **chrysopoga** Hue.

Hue in Nouv. Archiv. du Muséum, ser. 4, vol. I, 1899, p. 41; A. Zahlbr. in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 184.

Masafuera: Cordón del Barril, auf Felsen, steril (C. und I. Skottsberg).

***U. Steineri** A. Zahlbr.

A. Zahlbr. in Denkschrift. math.-naturw. Cl. Akad. Wiss. Wien, vol. LXXXIII, 1909, p. 183 et 186, tab. III, fig. 1—4; Howe jr. in Bryologist, vol. XVIII, 1915, p. 60.

*var. **subtorulosa** A. Zahlbr. nov. var.

Thallus pallide stramineus, erectus, fruticulosus, in specimine viso usque 7 cm altus, e basi iteratim dichotome et sympodialiter ramosus, rami primarii usque 1,6 mm crassi, hinc inde annulatim fissi, scabrisculi, sorediis albis, minutis, vix prominulis increbre obsiti, fibrillis biformibus, vel subulato-filiformibus, acutis ut in planta typica, plus minus incurvis, vel latioribus, subcylindricis et subtorulosis, acutatis vel obtusiusculis, minus dense sorediosis, sorediis minutis,

parum prominulis, demum plus minus confluentibus; medulla KHO c flavo sanguinea. Caeterum ut in typo.

Masafuera: im Hochlande, bei 1000 m, auf Rinden, fruchtend (C. und I. SKOTTSBERG).

U. angulata Ach.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 44.

Masafuera: auf Baumzweigen, fruchtend (C. SKOTTSBERG).

[*U. barbata* Fr., von JOHOW für Masafuera angegeben (Estud. Flora Juan Fernandez, 1896, p. 197), bezieht sich höchst wahrscheinlich nicht auf diese Art. JOHOW führt auch BERTERO als Sammler auf (Masatierra). MONTAGNE hat in seiner ersten Bearbeitung, Annal. Sci. Nat., Bot., sér. 2, vol. IV, 1835, p. 86 nur *U. barbata* var. *lævis* Mont. (BERTERO 1641); dasselbe Ex. nennt er aber in GAY, Hist. fisic. y polit. Chile, Bot., vol. VIII, 1852, p. 60 *U. plicata* Hoffm.; die Angabe bleibt fraglich.

U. ceratina Ach., MONTAGNE in Annal. Sci. Nat., Bot., ser. 2, vol. IV, 1835, p. 86: »crescit in ramos *Adesmiæ microphyllæ* Hook. et Arn.» (BERTERO no. 1783) ist zu streichen — siehe oben unter *Ramalina!* Bei GAY l. c. erwähnt MONTAGNE nicht Juan Fernandez; dagegen führt er hier, ebenfalls unter no. 1783 *U. florida* Hoffm. auf. No. 1783 umfasst mehrere Arten, alle auf dem Festlande gesammelt.]

Caloplacaceae.

Blastenia (Mass.) Th. Fr.

B. ferdinandeziana A. Zahlbr.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 46.

Apothecia demum convexa, margine depresso.

Scheint auf vulkanischem Gestein häufig zu sein.

Masatierra: Felswand beim SELKIRK-Denkmal, 590 m; Portezuelo de Villagra, 590 m; Bahía del Padre, auf Strandfelsen; Südabhang des Tres Puntas-Rückens (C. und I. SKOTTSBERG).

Sancta Clara (C. und I. SKOTTSBERG).

B. ferruginea (Huds.) Mass.

MASS. *Parmelia ferruginea* Fr.; MONT. Annal. Sc. Nat. Bot. sér. 2, vol. IV, 1835, p. 92.

Masatierra: Auf Baumrinden (BERTERO no. 1628).

Bombyliospora De Not.

B. dolichospora A. Zahlbr. nov. comb.

Lecidea dolichospora Nyl. in Annal. Scienc. Nat., Bot., ser. 4, vol. III, 1855, p. 162. — *Bacidia dolichospora* Trevis. in Linnaea, vol. XXVIII, 1856, p. 293.

»Auf *Xanthoxylum*-Rinde» (Herb. DELESSERT).

Caloplaca Th. Fr.

A. Sporae simpliciter septatae, membrana aequali cinctae, thallus isidiophorus *C. isidioclada.*

B. Sporae polari-bi- vel triloculares; thallus non isidiophorus.

I. Thallus crustaceus, uniformis.

1. Sporae polari-biloculares.

α. Species corticola; apothecia minuta, 0,2—0,3 (0,4) mm lata, pallida, vix conspicua *C. clandestina.*

β. Species saxicolae; apothecia distincte majora; apothecia laete colorata.

§. Thallus, late expansus, tenuiter rimulosus, granularis vel granulari-leprosus *C. Selkirki.*

§§. Thallus ex areolis formatus rotundatis, planis, superne laevigatis, plus minus dispersis *C. rubina.*

2. Sporae polari-triloculares *C. subcerina.*

II. Thallus effiguratus.

1. Laciniae marginales elongatae, lineares et rectae *C. orthoclada.*

2. Laciniae marginales breves et dilatatae *C. elegans* var. *australis.*

Sect **Eucaloplaca** Th. Fr.

***C. clandestina** A. Zahlbr. nov. spec.

Thallus epiphloeodes, substratum arcte obducens, tenuis, subochraceo-albidus, opacus, KHO magis flavescens, continuus, laevis, sorediis et isidiis non praeditus.

Apothecia lecanorina, parva, 0,3—0,4 mm lata, dispersa vel approximata, sessilia, tenuia; discus thallo fere concolor, vix magis lutescens, e concavo subplanus, madefactus turgidus;. margo thallinus disco concolor, tenuis, integer, haud prominulus; hymenium superne anguste fuscescenti-lutescens, non inspersum, KHO aurantiacum, caeterum aquoso-pellucidum, decolor; paraphyses tenues, 0,2—0,3 μ crassae, conglutinatae, simplices, inferne eseptatae, in parte superiore submoniliformes, tenuiter septatae, in ipso apice rotundato-clavatae; asci oblongo-clavati, ad apicem rotundati et membrana sat bene incrassata

cincti, 8-spori; sporae in ascis biseriales, decolores, late ellipsoideae vel ovales, polari-diblastae, luminibus apicalibus parvis, circa $^1/_4$ longitudinem sporarum metientes, isthmo tenui junctis, 10,5—12,5 μ longae et 8—9 μ latae.

Pycnoconidia non visa.

Masatierra: Zwischen anderen Rindenflechten eingesprengt fand ich nur einen einzigen Thallus dieser durch das dünne, fast häutige Lager, kleinen und hellen Apothezien sehr charakteristischen Flechte (C. und I. SKOTTSBERG).

***C. Selkirki** A. Zahlbr. nov. spec.

Thallus epilithicus, crustaceus, uniformis, expansus vel maculas minores formans, tenuis, vix 0,2 mm crassus, substratum obducens, citrino-aurantiacus vel rarius pallide ochraceo-citrinus, KHO rubens, tenuiter areolato-rimosus, areolis 0,2—0,3 mm latis, subplanis, in superficie passim paulum inaequalibus, subangulosis, fissuris tenuissimis separatis hinc inde in granulis minutis abientibus, granularis, rare leprosus, hypothallus tenuissimus, flavido-albidus, sorediis et isidiis non instructus, in margine bene limitatus, sed linea obscuriore non cinctus, superne strato corticali tenui, ex hyphis tenuibus et intricatis formato obductus; gonidia cystococcoidea; hyphae medullares non amylaceae; subtus albidus.

Apothecia lecanorina, dispersa vel approximata, sessilia, rotunda vel passim angulata, primum planiuscula et margine tenui, parum prominulo, integro vel subintegro cincta, mox convexa et fere semiglobosa, margine depresso, thallo intensius colorata, aurantiaca, subopaca, 0,5—0,7 (—1) mm lata; margo thallo paulum dilutior, extus strato corticali, tenui, 20—25 μ crasso, ex hyphis intricatis et inspersis, formato, KHO rubente obductus, gonidia crebra et medullam includens; excipulum decolor, I —, integrum, fere usque ad verticem hymenii assurgens, crassiusculum, subcartilagineum; hymenium superne sordide fuscescens, modice inspersum, KHO purpureum, caeterum decolor et purum, 80—90 μ altum, I intense coeruleum, demum obscuratum; paraphyses filiformes, strictae, conglutinatae, simplices, eseptatae, ad apicem parum latiores vel paulum capitatae; asci hymenio subaequilongi, oblongo-clavati, ad apicem rotundati et membrana bene incrassata cincti, 8-spori; sporae in ascis biseriales, decolores, ellipsoideo-ovales vel ovales, polari-diblastae, luminibus primum $^1/_3$, demum $^1/_4$ longitudinis sporarum metientibus, isthmo angusto, sed distincto junctis, 10—12 μ longae et 8—8,5 μ latae.

Die Art scheint auf Juan Fernandez sehr häufig zu sein, sie bewohnt vulkanisches Gestein, C. und I. SKOTTSBERG haben sie an folgenden Lokalitäten gesammelt:

Masatierra: Portezuelo de Villagra, an mehreren Stellen, 590 m; Cordón Salsipuedes, 465 m; Bahía del Padre, an Strandfelsen; niedriger Felsrücken am Südhange von Tres Puntas.

Masafuera: Quebrada de las Casas, in der Sturmregion am Meere; Strandfelsen unweit des Monotals und Cordón del Barril, 800—1200.

Erinnert einigermassen an *Caloplaca flavovirescens* (Wulf), doch ist der Thallus heller und dünner, die Sporen anders gestaltet und kleiner.

*C. **rubina** A. Zahlbr. nov. spec.

Thallus ex areolis parvis, 0,1—0,3 mm latis, rotundatis vel irregularibus, rarius paulum elongatis vel squamuliformibus, tenuissimis, planiusculis, substriato arcte adpressis, plus minus dispersis vel hinc inde etiam approximatis, nunquam crustam continuam formantibus compositus, aurantiacus, opacus, KHO purpureus, areolae marginales non radiantes, sorediis et isidiis non praeditus, superne strato corticali tenui obductus; stratum gonidiale continuum, gonidiis cystococcoideis, usque 18 μ latis.

Apothecia inter areolas thalli sessilia, lecanorina, cinnabarino-aurantiaca, opaca, parva, 0,2—0,4 mm lata, e concavo leviter convexa, KHO purpurea; margo thallinus primum tenuis, integer, parum prominulus, demum depressus, disco parum dilutior vel concolor, extus strato corticali, ex hyphis formato tenuibus et intricatis, in ambitu aurantiaco-fuscescente obductus, gonidia et medullam includens; excipulum haud distinctum; hypothecium decolor, molle, ex hyphis intricatis formatur, sublentiforme, strato gonidiali crassiusculo superpositum, I coeruleum; hymenium superne dense inspersum, aurantiaco-fuscum, KHO purpureum, caeterum decolor et purum, 75—80 μ altum, I violaceo-coeruleum; paraphyses filiformes, strictae, conglutinatae, simplices, in parte inferiore eseptatae, versus apicem sensim crassiores et depauperato-moniliformes, in ipso apice clavatae; asci ovali-clavati, hymenio subaequilongi, ad apicem rotundati et membrana calyptriformi-incrassato cincti, 8-spori; sporae in ascis subtriseriales, decolores, ovali- vel late ellipsoideae, rectae, polari-diblastae, loculi circa $^1/_3$ longitudinis sporarum metientibus, isthmo tenui junctis, 9—11 μ longae et 5—6 μ latae.

Masatierra: Südabhang des Rückens der Tres Puntas, auf vulkanischem Gestein (C. und I. SKOTTSBERG).

Santa Clara: Morro de los Alelíes (C. und I. SKOTTSBERG).

Masafuera: unterster Teil der Quebrada de las Casas, auf Felsen (C. und I. SKOTTSBERG).

Die Merkmale dieser neuen Art sind die kleinen, flachen, mitunter fast schuppenförmigen und mehr weniger zerstreut stehenden Lagerfelderchen, ferner die kleinen und lebhaft gefärbten Apothezien.

*var. **evolutior** A. Zahlbr. nov. var.

Thalli squamae paulum majores, usque 1 mm latae, incisae vel crenulatae, magis approximatae et centrum versus maculas thallinas fere areolatas formans.

Masafuera: im äussersten Teile der Quebrada de las Casas, auf Gestein (C. und I. SKOTTSBERG).

*C. **isidioclada** A. Zahlbr. nov. spec.

Thallus crustam formans sat expansam, demum irregulariter et sat late areolato-fissus, ex ramulis valde brevibus, 0,1—0,2 mm longis, subcoralloideis vel fere isidiomorphis, teretiusculis et ramosis, primum subverruculosis et de-

pressis, dense contextis formatus, aurantiacus, opacus, KHO purpureus, sorediis destitutus, hypothallus distinctus nullus.

Apothecia lecanorina, basi lata adpresso-sessilia, rotunda, sat tenuia, usque 1,2 mm lata; discus rufescenti-aurantiacus, opacus, epruinosus, planiusculus vel convexiusculus; margo thallinus tenuis, paulum prominulus, subcrenulatus, flavescens, persistens, subnitidus, extus strato corticali sat tenui, obscure ochraceo-fusco, insperso, KHO purpureo obductus, medulla incolore et pura, glomerulos gonidiorum includente; excipulum integrum, angustum, 18—20 μ crassum, decolor, pellucidum, ex hyphis tangentialibus, sat pachydermaticis et dense contextis formatum, maculas rotundas vel oblongas offerens, basi strato medullari, gonidia includenti superpositum; hypothecium fere decolor, molle, ex hyphis intricatis formatum, excipulo paulum crassius; hymenium superne aurantiaco-fuscum, pulverulentum, KHO purpureum, caeterum incolor, purum, 80—90 μ altum, I intense coeruleum; asci hymenio subaequilongi, oblongo- vel ellipsoideo-clavati, ad apicem membrana calyptratim incrassata instructi, 8-spori; paraphyses subgelatinose conglutinatae, filiformes, simplices, versus apicem sensim crassiores, superne moniliformiter-septatae et in ipso apice clavatae; sporae in ascis bitriseriales, decolores, ellipsoideae vel fere ovales, utrinque rotundatae vel paulum angustatae, uniseptatae, septo primum sat tenui, mox crassiore, ad septum non vel leviter constrictae, rectae, membrana primum aequali, demum subinaequali cinctae et loculis demum parvis, distantibus, sed isthmo distincto non junctis, 8—12 μ longae et 5—7 μ latae.

Masafuera: auf der Erde und über durch Algen verunreinigten Moosen (C. und I. SKOTTSBERG).

Erinnert habituell an die chilenische *Caloplaca microphylla* (Hue) A. Zahlbr., besitzt aber ganz anders gestaltete Sporen und ist mit jener nicht näher verwandt.

Sect. **Triophthalmidium** (Müll. Arg.) A. Zahlbr.

*C. subcerina A. Zahlbr. nov. comb.

Lecanora erythroleuca var. *subcerina* Nyl. in Flora, vol. LII, 1869, p. 119. — *Callopisma australe* Müll. Arg. in Flora, vol. LXIV, 1881, p. 100. — *Placodium subcerinum* Wain., Etud. Lich. Brésil, vol. I, 1890, p. 123. — *Lecidea subcerina* Hue in Bull. Soc. Bot. France, vol. LVIII, 1911, sess. extraord., p. LXXXVI, tab. III, fig. 15 et in Nouv. Archiv. du Muséum, ser. 5, vol. IV, (1910) 1914, p. 5, fig. 63.

var. **aurantiaca** A. Zahlbr. nov. comb.

Callopisma australe var. *aurantiacum* Müll. Arg. in Flora, vol. LXIV, 1881, p. 100. — *Lecanora erythroleuca* var. *aurantiaca* Stzbgr. in Bericht über die Thätigk. St. Gallisch. naturw. Gesellsch. 1888—89, 1890, p. 206.

Masafuera: Quebrada de la Lobería, bei 300 m, auf älteren *Luma*-Borken (C. und I. SKOTTSBERG).

Hierbei gehört vielleicht auch noch ein auf einer Felswand des Cordón Salsipuedes, 465 m, gesammeltes Stück, dessen Sporen gut übereinstimmen,

Fruchtscheibe indes dunkel ist und dadurch an die var. *crenulata* (Müll. Arg.) herantritt, von dieser aber durch den nicht krenulierten Fruchtrand abweicht. Das es sich nur um ein einziges und dürftiges Exemplar handelt, kann ich nicht feststellen, ob die Kombination der beiden Merkmale konstant und von taxonomischem Wert ist.

Sect. **Gasparrinia** (Tornab.) Th. Fr.

C. elegans (Link.) Th. Fr. var. **australis** A. Zahlbr. nov. comb.

Xanthoria parietina var. *australis* A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 49.

Thallus miniatus, aurantiacus, vel rutilus, rare vitellino-variegatus, iteratim lobatus, lobis varie formatis, lobi marginales in parte substrati horizontali et laeviore tenues, lineares, convexae, arcte substrato affixi ut in var. *tenui* (Wahlbg.), in locis aliis latiores, inaequaliter dilatati, subgyrosi, usque 5 mm longi et 1—1,2 mm lati, in superficie inaequales, subcanaliculati vel foveolato-excavati, in partibus thalli verticaliter sitis usque 2 mm longi, continui, applanati, adpressi, lobis *Xanthoriae parietinae* angustioribus similes. Stratum corticale paginae superioris thalli hinc inde interruptum et maculas parvas, rotundas, albas et concavas offert medullae denudatae.

Die Durcharbeitung eines reichen Materials hat mich zur Überzeugung gebracht, dass es sich um eine Abänderung der *Caloplaca elegans* und nicht um eine kleinlappige Form der *Xanthoria parietina* handelt. Der Bau der Rinde des Lagers, den ich nunmehr an vielen Stücken zu studieren Gelegenheit hatte, weist auf *Caloplaca elegans*.

Masatierra: Puerto Frances, bei 50 m; Puerto Ingles unweit der Robinsonhöhle und Bahía del Padre, auf Strandfelsen (C. und I. SKOTTSBERG).

Santa Clara: Morro de los Alelíes, auf hartem Gestein (C. und I. SKOTTSBERG).

Masafuera: Quebrada del Mono und an Strandfelsen in der Quebrada de las Casas (C. und I. SKOTTSBERG).

***C. orthoclada** A. Zahlbr. nov. spec.

Thallus placodiomorphus, centrifugus, plagas usque 6 cm latas formans, plagis plus minus confluentibus, tartareus, aurantiacus, subopacus, vel fere cerinus, KHO kermesinus, in centro primum verruculoso-areolatus et apothecia crebra et approximata gerens et ab eis fere omnino obtectus, ibidem mox emoriens et albidus, lobi marginales elongati, usque 1,5 cm longi, angusti, 0,3—0,5 mm lati, stricti, recti vel subrecti, contigui, convexi, dichotome vel sympodialiter ramosi, in apice paulum latiores, integri, retusi vel minute crenulati, substrato arcte adnati, subtus albi, rhizinis destituti, passim inaequaliter dilatati et subtorulosi, hinc inde, sed rare, tenuiter transversim rupti, sorediis et isidiis destitutus; superne strato corticali 16—19 μ crasso, pulverulento-

insperso, KHO purpureo, sordide aurantiaco, ex hyphis densissime intricatis formato obductus; medulla alba, ex hyphis subhorizontalibus et leviter intricatis composita, I —; gonidia glomerata, glomerulis subcontiguis, cellulis laete viridibus, 13—16 μ latis.

Apothecia lecanorina (primum habitu gyalectoideo), et in centro thalli, et in lobis marginalibus superficialia, alte sessilia, rotunda, parva, usque 0,5 mm lata; discus croceus, opacus, KHO purpureus, epruinosus, e concavo subplanus; margo thallinus crassiusculus, integer, persistenter bene prominulus, thallo concolor, strato corticali angusto obductus, medullam et gonidia includens; excipulum haud distinctum; hypothecium pallide lutescens, molle, ex hyphis intricatis formatum; hymenium superne anguste aurantiaco-fuscum, inspersum, caeterum decolor, purum, 80—90 μ altum, I coeruleum; paraphyses filiformes, strictae, conglutinatae, simplices, eseptatae, ad apicem capitato-clavatae; asci hymenio subaequilongi, oblongo-clavati, ad apicem rotundati et membrana modice incrassata cincti, 8-spori; sporae in ascis biseriales, decolores, ellipsoideae vel subovales, rectae, polari-diblastae, luminibus circa $^1/_3$ longitudinis sporarum mebtientibus, isthmo tenui junctis, 8,5—10 μ longae et 5—5,5 μ latae.

Pycnoconidia non visa.

Masafuera: Strandfelsen in der Quebrada del Mono (C. und I. SKOTTSBERG).

Eine ausserordentlich zierliche Flechte, charakterisiert durch die schmalen, verhältnismässig langen Randlappen, welche auch Apothezien tragen; sie nähert sich der *Caloplaca Feliponei* A. Zahlbr. und gehört nach der Gestalt der Sporen in die Gruppe der *Caloplaca murorum*.

Theloschistaceae.

Theloschistes Norm.

***Th. flavicans** (Sw.) Müll. Arg.

f. **glabra** Wain.

WAIN., Étud. Lich. Brésil, vol. I, 1890, p. 114.

Masatierra: Puerto Frances; Portezuelo, 600—625 m, zwischen anderen Flechten auf Baumrinden und über Moosen, steril (C. und I. SKOTTSBERG).

Buelliaceae.

Buellia De Not.

A. Thallus flavidus vel stramineus, $Ca\,Cl_2O_2$ optime lateritius *B. concinna* var. *oceanica*.

B. Thallus albidus vel cinerascens.

a. Apothecia immersa vel subimmersa *B. stellulata*.

b. Apothecia sessilia vel adpressa.

I. Sporae siphoniatae — *B. siphoniatula.*
II. Sporae simpliciter uniseptatae.
1. Thallus KHO sanguineus — *B. fernandeziana.*
2. Thallus KHO — — *B. halophila.*

*B. **concinna** Th. Fr.

Th. Fr. in Nova Acta Reg. Soc. Scient. Upsal., ser. 3, vol. III, 1861, p. 332 et Lichenogr. Scand., vol. I, 1874, p. 600. — *Lecidea concinna* Stzbgr. in Bericht. über die Thätigk. St. Gallisch. naturw. Gesellsch. 1874—1875, 1876, p. 236; Nyl., Lich. Pyren. Orient., 1891, p. 36.

*var. **oceanica** A. Zahlbr. nov. var.

A planta europaea differt in eo, quod medullae hyphae pro majore vel pro minore parte Iodo violaceo tinguntur et sporis paulum minoribus.

Thallus crustaceus, uniformis, tartareus, cervino-ochroleucus, nitidulus, KHO flaveus, $CaCl_2O_2$ bene lateritius, substrata laxiuscule adhaerens, maculas irregulares formans, verruculoso-areolatus, areolis alte convexis, 0,3—0,5 mm latis, confertis, subangulosis vel rotundatis, marginalibus paulum longioribus et angustioribus, in margine linea obscuriore non cinctus, sorediis et isidiis destitutus.

Apothecia in superficie verrucarum thalli sessilia, solitaria vel rarius bina, nigra, opaca, minuta, 0,25—0,45 mm lata, mox convexa, margine haud conspicuo; excipulum crassum, fuligineum, versus hymenium fuscum et NO_5 fusconigrum; hymenium purum, superne anguste obscure fuscum, inferne dilute aeruginoso-fuscescens, 100—110 μ altum; paraphyses simplices, eseptatae; sporae in ascis subuniseriales, fuscae, uniseptatae, late ellipsoideae vel ovales, rectae, ad septum non constrictae, 8,5—10,5 μ longae et 5—5,5 μ latae.

Santa Clara: Morro de los Alelíes, auf hartem Gestein (C. und I. Skottsberg).

*B. **siphoniatula** A. Zahlbr. nov. spec.

Thallus crustaceus, uniformis, tenuissimus, ochraceo-cinerascens, opacus, KHO —, $CaCl_2O_2$ —, KHO + $CaCl_2O_2$ —, fere continuus, siccus minute subareolatus vel subleprosus, madefactus subverruculoso-inaequalis, in margine linea tenui nigricante cinctus, sorediis et isidiis destitutus; superne strato corticali pertenui obductus; medulla albida, ex hyphis non amylaceis formata; stratum gonidiale continuum vel subcontinuum, cellulis globosis, dilute et laete viridibus, 7,5—9 μ latis.

Apothecia lecideina, adpresse sessilia, parva, 0,5—0,8 mm lata, nigra, nitidula, primum concava, margine proprio tenui et integro cincta, demum leviter convexa margine paulum depresso; excipulum integrum, carbonaceum, infra hymenium angustatum; hypothecium tenue, fuscum; hymenium superne nigricanti-fuscum, KHO —, NO_5 —, non inspersum, caeterum decolor et purum, 80—90 μ altum, I intense violaceo-coeruleum; paraphyses filiformes, gelatinoso-

conglutinatae, simplices, eseptatae, ad apicem clavatae et calyptratim obscuratae; asci hymenio subaequilongi, oblongo- vel ellipsoideo-clavati, superne rotundati et membrana incrassata cincti, 8-spori; sporae in ascis plus minus biseriales, e fumoso fuscae, ovales vel late ellipsoideae, rarius subrhomboidales, rectae, versus apicem angustatae, sed in ipso apice rotundatae, luminibus cellularum primum apicalibus, circa $^1/_8$ longutidinis sporarum mentientibus, isthmo tenui, sed distincto junctis, demum magis approximatis, anguloso-rotundatis vel subcordatis, parvae, 16—20(—22) μ. longae et 8—9 μ. latae.

Masatierra: Bahía del Padre, an Strandfelsen (C. und I. SKOTTSBERG).

Zum Vergleich können *Buellia posthabita* (Nyl.) A. Zahlbr. und *Buellia falklandica* Darb. herangezogen werden. Das nicht areolirte Lager, die angepresst-sitzenden, angefeuchtet nicht durchscheinden Apothezien und das nicht ausgesprochen herzförmige Sporoblast der Sporen unterscheiden sie von der ersteren, das am Grunde nicht fussförmig verlängerte Gehäuse und die nicht breit abegerundeten Sporen von der letzteren Art.

***B. stellulata** Mudd.

MUDD, Man. Brit. Lich., 1861, p. 216; Th. Fr., Lichenogr. Scand., vol. I, 1874, p. 603; Wain. in Arkiv för Bot., vol. VIII, no. 4, 1909, p. 80. — *Lecidea stellulata* Tayl. apud Mack., Flore Hibern., vol. II, 1836, p. 118.

Scheint auf vulkanischen Gestein eine häufige Art zu sein.

Masatierra: Gipfel des Cerro Negro, 190 m; Bahía del Padre, an Strandfelsen; Südabhang des Tres Puntasrückens (C. und I. SKOTTSBERG).

Santa Clara: Morro de los Alelíes (C. und I. SKOTTSBERG).

Masafuera: Quebrada del Mono, an Strandfelsen; Quebrada de las Casas und im unteren Teil der Quebrada de las Vacas (C. und I. SKOTTSBERG).

***B. halophila** Müll. Arg.

MÜLL. ARG. in Bull. Herb. Boissier, vol. I, 1893, p. 52.

Thallus KHO —, $Ca\,Cl_2O_2$ —, in margine linea tenui fumosa cinctus.

Masatierra: Bahía del Padre, bei 50 m, auf losen Blöcken (C. und I. SKOTTSBERG).

B. fernandeziana A. Zahlbr.

A. ZAHLBR. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 53.

Masatierra: Bahía del Padre, auf Lava (C. SKOTTSBERG).

Die Zahl der auf Juan Fernandez vorkommenden Buellien ist durch die angeführten Arten nicht erschöpft. Indes konnten mehrere Arten nicht sicher

bestimmt werden, da es mir unter den gegebenen Umständen nicht möglich war, mehrere Urstücke, deren Beschreibung nicht ausreichte, um die schwierigen Arten der Gattung *Buellia* von einem einheitlichen Standpunkt zu behandeln, fehlten und unter den obwaltenden Verhältnissen bestand keine Aussicht, sie zu erhalten. Ich hoffe, bei einer späteren Gelegenheit auf diese Buellien zurückzukommen.

Physciaceae.

Pyxine (Fr.) Nyl.

***P. curvatula** A. Zahlbr. nov. spec.

Thallus substrato adhaerens, sed non arcte adpressus, membranaceus, tenuis, ad 0,2 mm crassus, rosulas usque 4,5 cm latas formans, albus, madefactus glaucescens, fere opacus, KHO superne flavens, Ca Cl_2O_2 —, iteratim et sat irregulariter divisus, laciniis primariis usque 1 mm latis, convexiusculis, superne laevigatis, hinc inde subimbricatis vel subcomplicatis, utplurimum versus apicem laciniarum, sed etiam in centro thalli, interruptim isidiis brevibus, 0,3—0,5 mm longis, cylindricis, valde tenuibus, rectis, utplurimum angustis praeditis, subtus pallidus (albidus vel dilute fuscescens), rhizinis increbris, validiusculis et sat brevibus obsitus, sorediis destitutus; utrinque corticatus; cortex superior 20—26 μ crassus, non inspersus, paraplectenchymaticus, ex hyphis perpendicularibus septatisque formatus, cellulis leptodermaticis, subanguloso-rotundatis, 4—6 μ in diam., in seriebus superpositis utplurimum 4, superne strato valde tenui, amorpho supertectus; cortex inferior versus medullam inaequaliter incrassatus, ex hyphis 3,5—4 μ crassis, subhorizontalibus et modice intricatis formatus; stratum gonidiale infra corticem superiorem dispositum, tenue, haud continuum, gonidiis globosis, dilute viridibus, 5—8 μ latis; medulla alba, KHO —, Ca Cl_2O_2 —, ex hyphis laxiusculis, non inspersis, ramosis et sat leptodermaticis formata; rhizinae validiusculae, 50—100 μ crassae, e basi breviter et increbre ramosae, dilute fuscescentes vel passim fere decolores, ex hyphis longitudinalibus, tenuibus et dense contextis formatae.

Apothecia superficialia, sessilia, lecideina, parva, 0,2—0,3 mm lata, nigra, opaca, mox leviter convexa, immarginata; excipulum integrum, fuscum, cum hypothecio confluens, gonidia nulla includens; hypothecium ochraceo-fuscum, KHO haud mutatum, ex hyphis intricatis formatum; hymenium superne non inspersum, fuscum, KHO —, caeterum decolor et purum, 75—85 μ altum, I coeruleum; paraphyses filiformes, conglutinatae, simplices, eseptatae, ad apicem capitato-clavatae et obscuratae; asci hymenio subaequilongi, ovali-clavati, superne rotundati et membrana bene incrassata cincti, recti, 8-spori; sporae in ascis biseriales, fuscae, ellipsoideo-oblongae, oblongae vel etiam cylindrico-oblongae, utrinque rotundatae, normaliter curvulae vel leviter arcuatae, septo tenui, ad septum non constrictae, membrana tenui et aequali cinctae 15—20 μ longae et 4,5—6 μ latae.

Pycnoconidia non visa.

Masatierra: Puerto Inglés, 550 m, im Wald auf Baumstämmen (C. und I. SKOTTSBERG).

Die kleinen Apothezien, die gekrümmten Sporen und die kurzen Isidien sind die Merkmale der neuen Art.

Physcia (Schreb.) Wain.

***Ph. picta** Nyl.

NYL. in Mémoir, Soc. Imp. Scienc. Natur. Cherbourg, vol. III, 1855, p. 175 et Synops. Lich., vol. I, 1860, p. 430, tab. VIII, fig. 53; WAIN., Étud. Lich. Brésil, vol. I, 1890, p. 150. — *Lichen pictus* Sw., Nova Gener. et Spec. Plant., 1788, p. 146.

Mastatierra: auf dem Bergrücken zwischen der Quebrada Villagra und Bahía Chupones, 386 m, auf Gestein, steril (C. und I. SKOTTSBERG).

Anaptychia Körb.

A. Laciniae thalli in margine fibrillis nigricantibus, demum squarroso-ramosissimis, 1—2 μ longis obsitus *A. hypoleuca.*

B. Laciniae thalli in margine fibrillis pallidis, simplicibus, 0,5—0,8(—1) mm longis ornati *A. dactyliza* f. *pectinata.*

***A. hypoleuca** (Muhlb.) Mass.

var. **colorata** A. Zahlbr. nov. comb.

Pseudophyscia hypoleuca var. *colorata* A. Zahlbr. in Sitzungsber. Akad. Wiss. Wien, math.-naturw. Cl., vol. CXI, 1 Abb., 1902, p. 413. — *Pseudophyscia hypoleuca* f. *caesiocrocata* Cord. in Brotéria, ser. bot., vol. XII, 1914, p. 179.

Masatierra: steinige Heide südlich von Tres Puntas steril (C. und I. SKOTTSBERG).

***A. dactyliza** A. Zahlbr. nov. comb.

Physcia speciosa var. *dactyliza* Nyl., Synops. Lich., vol. I, 1860, p. 417. — *Pseudophyscia speciosa* var. *dactyliza* Müll. Arg. in ENGLER, Bot. Jahrbuch., vol. XX, 1894, p. 260.

*f. **pectinata** A. Zahlbr. nov. f.

Thallus substrato adpressus, radiatim crescens, rosulas rotundas (in specimine viso 6 cm latas) formans, subcartilagineus, albidus vel albus, nitidulus, KHO superne lutescens, Ca Cl_2O_2 —, laevigatus, sorediis et isidiis non praeditus, iteratim et dichotome et trichotome laciniatus, laciniae elongatae, lineares (0,6)—1—1,2 mm latae, subplanae, utplurimum contiguae, rare laxiusculae, plus

minus divaricatae, ad apicem paulum latiores, rotundato-retusatae vel emarginatae in margine ciliis albis vel albidis (rare dilute fuscescentibus), rigidiusculis, simplicibus, normaliter 0,3 mm longis, sat densis, plus minus patentibus, leviter recurvis vel arcuatis obsitae, subtus lacteus, rhizinis nullis; superne tantum corticatus, cortex extus leviter fuscescens, non inspersus, caeterum albidus, ex hyphis subhorizontalibus, modice intricatis et conglutinatis formatus, subcartilagineus, inaequalis, 60—100 μ crassus; stratum gonidiale sat angustum, non continuum, gonidiis glomeratis, glomerulis vel majoribus vel minoribus, cellulis laete viridibus, globosis, 8—10 μ latis; medulla alba, KHO —, Ca Cl_2O_2 —, inferne nuda, a cortice non obducta, ex hyphis 5—8 μ crassis, increbre ramosis, non inspersis, in parte infera medullae plus minus liberis.

Apothecia in centro thalli copiosa, superficialia, sessilia, in basi angustata, congesta, cupuliformia, usque 5 mm lata; discus concavus, obscure fuscus, levissime pruinosus vel fere nudus; margo thallinus parum inflexus, primum subinteger, demum in lobulos parvos angustos abiens, cilia nulla gerens; receptaculum extus glabrum et nudum, pallidum, corticatum, cortice chondroideo, usque 140 μ crasso, ex hyphis tenuibus et dense intricatis formato, extus fuscescente, infra corticem medullam et gonidia includens; hymenium superne sordide fuscum, dense pulverulentum, caeterum decolor et purum, usque 200 μ altum, I obscure coeruleum; hypothecium angustum, dilute lutescens, molle, ex hyphis intricatis formatum; paraphyses filiformes, strictae, gelatinose conglutinatae, simplices, eseptatae, ad apicem vix latiores; asci oblongo-clavati, ad apicem rotundati et membrana primum bene incrassata cincti, 8-spori; sporae in ascis biseriales, e fumoso fuscae, late ellipsoideae, rectae, ad apices rotundatae, in margine hinc inde leviter emarginatae, luminibus rhomboideo-ovalibus vel subcordatis, approximatis, 35—40 μ longae et 17—20 μ latae.

Conceptacula pycnoconidiorum immersa, vertice punctiformi et nigro prominula, globosa; perifulcrium pallidum, tantum circa ostiolum obscuratum; fulcra endobasidialia; pycnoconidia recta vel subrecta, breviter bacillaria, ad 3,5 μ longa.

Masatierra: Quebrada Damajuana, ad truncos *Aristoteliae maqui* (C. und I. SKOTTSBERG).

Wegen der unberindeten Thallusunterseite muss man *Anaphtychia dactyliza* von *Anaptychia speciosa* als eigene Art abtrennen. Die Varietät unterscheidet sich vom Typus durch die hellen und kurzen Marginalzilien des Lagers.

[*A. leucomelaena* (L.) Wain. — *Parmelia leucomelas* Ach.; MONT. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 90; »Crescit ad ramos *Adesmiæ microphyllæ*» (BERTERO no. 1783) — ist zu streichen; vgl. oben bei *Ramalina*.]

Hymenolichenes.

Cora Fr.

C. pavonia (Web.) Fr.

Mont. in Annal. Scienc. Nat., Bot., ser. 2, vol. IV, 1835, p. 195; A. Zahlbr. in Kgl. Svensk. Vetensk.-Akad. Handl., vol. LVII, no. 6, 1917, p. 56.

Masatierra: Auf Felsen, Baumrinden und auf dem Erdboden (Bertero no. 1649); häufig in der Regenregion, auf Baumzweigen, auf der Erde auf zerbröckelnden vulkanischem Gestein (C. Skottsberg); Puerto Frances, Loma Incienso; Cordón Chifladores, 200 m; Valle Anson, 149 m, auf Heideboden; Cordón Escarpado, El Pico, 365 m; niedriger Rücken östlich von der Kolonie, 147 m; östlich von Villagra, auf losem Tuff und auf der Erde (C. und I. Skottsberg).

Masafuera: Heide oberhalb der Quebrada del Mono, 850 m; Los Inocentes, im *Dicksonia*-Wald, bei 950 m (C. und I. Skottsberg).

Erklärung der Abbildungen.

Tafel 24.

Fig. 1. *Arthonia cytisi* Mass.
Fig. 2. *Arthonia berberina* A. Zahlbr.
Fig. 3—4. *Arthonia cytisi* var. *meridionalis* A. Zahlbr.
Fig. 5. *Coccocarpia Gayana* var. *subdivisa* A. Zahlbr.
Fig. 6. *Ocellularia subdenticulata* A. Zahlbr.
Fig. 7. *Psoroma cephalodinum* A. Zahlbr.

Tafel 25.

Fig. 1. *Sticta Berteroana* Mont.
Fig. 2. *Byssocaulon niveum* Mont.
Fig, 3. *Psoroma angustisectum* A. Zahlbr.
Fig. 4. *Physma chilense* Hue.
Fig. 5. *Cetraria antarctica* A. Zahlbr.
[Fig. 6. *Siphula potyschistes* f. *sorediosula* A. Zahlbr. In Chile gesammelt.]
Fig. 7. *Lemmopsis polychidioides* A. Zahlbr.

Register

der neuen Arten, Varietäten, Formen und Kombinationen.

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Anhang.

Flechtenparasiten,

bearbeitet von Dr. K. KEISSLER.

Sphaerulina spec.

Auf dem Thallus von *Usnea dasypoga* var. *dasypogoides* Nyl. Masatierra, Puerto Frances. — Wahrscheinlich eine neue Art, doch das Hymenium etwas mangelhaft entwickelt, so dass eine Neubeschreibung nicht möglich ist.

? **Leptosphaeria galligera** Keissl. in Beih. Bot. Centralbl. 2. Abt. Bd. 37 (1920) p. 274.

Auf dem Thallus von *Parmelia cetrata* f. *sorediifera* Wain. Masatierra, Masafuera, Quebr. Lobería. — Bildet braune Gallen ganz ähnlich die ich für *Parmelia cetrata* Zahlbr. beschrieb (Sandwichs-Inseln, leg. ROCK). Da die Gebilde steril sind, ist leider eine sichere Bestimmung nicht möglich.

Pharcidia Schaereri Arn. in Verh. zool.-bot. Ges. Wien, Bd 21 (1871) p. 1145; VOUAUX in Bull. soc. myc. France, vol. 28 (1912) p. 229.

Auf dem Thallus und den Apothecien von *Caloplaca Selkirki* Zahlbr., Masatierra, Bahía del Padre. — Sporen 12—15×3 μ, meist mit 2 Scheidewänden. Auch VOUAUX l. c. gibt bereits an, dass gelegentlich 2—3 Scheidewände vorkommen. Es ist daher zu fragen, ob die Art nicht besser bei *Sphaerulina* untergebracht wäre.

Capnodium spec.

Auf dem Thallus und den Apothecien von *Psoroma saccatum* (R. Br.); Masatierra, Salsipuedes. — Ein auf den betreffenden Zweigen nur in Form eines sterilen *Torula*-Myzel entwickeltes *Capnodium* greift auch auf die Flechte über.

Mycobilimbia (ex. aff. *anomea* Sacc.).

Auf *Sticta carpoloma* Del., Masatierra, Salsipuedes. — Auf dem Thallus finden sich schwarze Klümpchen, welche aus in einander fliessenden, meist lirellenförmigen Apothecien bestehen. Es dürfte eine neue Art aus der Verwandtschaft von *M. anomea* Sacc. vorliegen, doch konnte dieselbe nicht beschrieben werden, da nur weniges und zudem schlecht entwickeltes Material zur Hand war. Schläuche cylindrisch-keulig, mit kurzem aber deutlichem Stiel, namentlich an der Spitze stark verdickt, c. 70—90 × 15—18 μ, I+ (erst gelb, dann grünlich, schliesslich blau), K —; Sporen 8, annähernd 2-reihig, farblos, länglich, mit 3 Wänden und ungefähr quadratischen Zellen, ca. 21—25×8 μ. Paraphysen farblos, etwas länger als die Schläuche, verästelt, etwas gebogen, aber kein eigentliches Epithecium bildend (vielleicht zurückgeblieben).

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J. Fleischmann ad nat. finx.

J. Fleischmann ad nat. pinx.

12. The Musci of the Juan Fernandez Islands.

By

V. F. BROTHERUS.

With 2 plates (26—27).

Dr. C. BERTERO, well known for his important collection of vascular plants made during several months' residence in Masatierra in 1830, was also the first who contributed to our knowledge of the Juan Fernandez mosses, of which MONTAGNE enumerates 17 species.[1] So far as I have been able to identify these without having access to the original specimens, they have been included in my list. Mr. E. C. REED later collected a few species which were determined by MITTEN (REED is not mentioned, but is identical with »Mr. SAUNDER's collector») together with the collection made by Mr. MOSELEY during the Challenger expedition, and published by HEMSLEY in the Challenger Report, vol. I. Finally, JOHOW compiled a list of all species quoted for Juan Fernandez.[2] A revised copy of this is found at the end of my paper.

In August 1908, Professor SKOTTSBERG spent 8 days in the islands; after his return, the small collection of mosses was handed over, together with ample material from Chile, Fuegia etc., to M. JULES CARDOT. The preliminary list of CARDOT contained 38 species, of which 19 were labelled as new. Unfortunately, M. CARDOT did not get an opportunity to publish his report before the War, and during the occupation of Charleville by the German army a part of his herbarium was lost, including the mosses from Juan Fernandez, of which no descriptions had been prepared. This loss is the more to be regretted as SKOTTSBERG, in his sketch of the vegetation, had inserted the names of the mosses.[3] Undoubtedly the greater part of these was found again in 1916—17, and many of the species described below must have been among CARDOT's material, but as it is of course quite impossible to arrive at any safe conclusion in this matter, the following names, written by CARDOT on the labels and published by SKOTTSBERG, will always remain nomina nuda and have to disappear: *Anoectangium fernandezianum, Bartramia leptophylla, Bryum fernandezianum, Campylopus fernandezianus, C. fuscoluteus, Didymodon oligodontus,*

[1] Prodromus Florae Fernandezianae. Ann. Sc. Nat. Sér. 3, vol. 4.

[2] Estudios sobre la Flora de las Islas de Juan Fernandez. Santiago 1896.

[3] Studien über die Vegetation der Juan Fernandez-Inseln. K. Svenska Vet.-Akad. Handl. Bd. 51, No. 9.

Fissideus brachyloma, F. curvinervis, F. fernandezianus, Isopterygium fernandezianum, Philonotis litorea, Rhaphidostegium prostratum, Rhynchostegiella leptoneura, Rhynchostegium concavifolium, Rh. planirameum, Rigodium acuminatum, R. elegantulum, Streptocalypta fernandeziana, Trichostomum fernandezianum.

The species in the 1908 collection identified by CARDOT with species known before but not found again in 1916—17 are quoted in my list and designated »SKOTTSBERG 1908».

During their expedition in 1916—17 Professor and Mrs. SKOTTSBERG spent five months on Masatierra and Masafuera and brought back a considerable moss collection studied by the author. The result is published here. The collectors are in all cases where no other name appears, C. and I. SKOTTSBERG.

Up to now 128 species have been reported from the island, of which 47 so far are endemic.

Ditrichaceae.

Pleuridium Brid.

P. Robinsonii (Mont.) Mitt.

Masatierra: Sine loco designato (BERTERO).
Area: Chile.

Ditrichum Timm.

D. affine (C. Müll.) Hamp.

Masatierra: Portezuelo de Villagra; ad marginem viae, c. 575 m. s. m. (79). Ad terram humidam secus viam ad Portezuelo; c. 450 m. s. m. (33) et c. 550 m. s. m. (78). Portezuelo, Co. Pirámide; 600 m. s. m. (34).

Masafuera: Quebrada del Mono; ad rupem in silva (32). Correspondencia; 1100 m. s. m. (80).

Area: Chile, Patagonia, East Australia, New Zealand.

D. longisetum (Hamp.) Jaeg.

Masafuera: Prope Las Torres; ad terram siccam, apertam; c. 1360 m. s. m. (81). Las Torres; ad rupem humidam; 1370 m. s. m. (82). Correspondencia; ad moles; c. 1350 m. s. m. (83). Prope Las Torres; ad rupes; c. 1370 m. s. m. (84, fo. microcarpa).

Area: Chile, W. Patagonia, Fuegia.

Ceratodon Brid.

C. purpureus (L.) Brid.

Masatierra: Puerto Frances; ad saxa (35, fo. foliis nervo crassiore instructis).

Masafuera: Quebrada del Blindado; ad terram siccam (36). Quebrada Casas; ad moles (99) et ad saxa (100).

Area: Cosmopolitan.

Pottiaceae.

Hymenostomum R. Br.

H. Kunzeanum (C. Müll.) Broth.

Masatierra: Secus viam ad Portezuelo; c. 475 m. s. m. (102).

Area: Chile.

Gymnostomum Hedw.

G. calcareum Bryol. germ.

Masatierra: Valle Colonial (372).

Masafuera: Quebrada de las Vacas (373).

Area: Europe, Azores, North Africa, Caucasus, Himalaya, Sibiria, North America, Ecuador, Chile, East Australia, Tasmania, New Zealand.

Trichostomum Hedw.

T. brachydontium Bruch.

Masafuera: Quebrada de las Casas; ad moles (103).

Area: Europe, Caucasus, Algier, Marocco, Madeira, Canary Isl., Bourbon, Japan, New Zealand.

Dicranaceae.

Amphidium Nees; Bryol. eur.

A. cyathicarpum (Mont.) Broth.

Masatierra: Sine loco designato (MOSELEY); Portezuelo de Villagra; c. 450 m. s. m. Salsipuedes; ad rupes, 464 m. s. m. (58). Quebrada Danajuana; ad rupes: 345 m. s. m. (77).

Masafuera: secus viam inter Quebrada de las Casas et Papal; ad rupes; 200 m. s. m. (57). Quebrada del Blindado; 440 m. s. m. (478).

Area: East and South Africa, Cameroons, Ecuador, Chile, East Australia, Tasmania, New Zealand.

Dicranella Schimp.

D. costata Broth. n. sp.

Dioica; tenella, caespitosa, caespitibus laxis, laete viridibus, vix nitidiusculis. Caulis erectus, vix ultra 2 mm altus, infima basi fusco-radiculosus, dense foliosus, simplex. Folia infima minuta, superiora multo majora, sicca flexuosula, humida e basi semivaginante, oblonga sensim in laminam patentem, canaliculato-concavam, lanceolato-subulatam, obtusiusculam vel obtusam attenuata, c. 2,5 mm longa et usque ad 0,3 mm lata, marginibus erectis, superne dense serrulatis; nervo viridi, basi bene limitato ibidemque c. 0,75 mm lato, usque ad apicem a lamina distincto, continuo vel subcontinuo; cellulis laminalibus minutis, subquadratis vel breviter rectangularibus, chlorophyllosis, basilaribus raptim multo majoribus, rectangularibus, teneris, hyalinis. Bracteae perichaetii foliis similes, sed altius vaginantes, lamina longiore. Seta 5—7 mm alta, stricta, tenuissima, straminea. Theca erecta, regularis, e collo brevi, crassiusculo ovalis, 1 mm vel paulum ultra longa et c. 0,5 mm crassa, sicca 8 costata, urnacea, fusca, nitidiuscula; cellulis exothecii parenchymaticis, laxis, leptodermibus, ad orificium minoribus. Exostomii dentes ultra medium divisi, cruribus inaequalibus, rubri, longitudinaliter striati. Spori 20—22 μ, fusci, papillosi. Caetera ignota.

Masatierra: ad terram humidam, humosam secus viam ad Portezuelo de Villagra, una cum *Ditricho affini;* c. 450 m. s. m. (1). Portezuelo de Villagra; ad marginem viae; c. 575 m. s. m.

Masafuera: Cerro Correspondencia; ad ligna putrida parce; c. 1140 m. s. m. (2).

Species ob thecam regularem, costatam cum *D. crispa* (Ehrh.) Schimp. comparanda, sed notis caeteris diversissima.

Oncophorus Brid.

O. fuegianus Card.

Masafuera: Quebrada de las Casas, ad rivulos sat frequenter (477). Area: Patagonia, Fuegia.

Dicranoloma (Ren.) Ren.

D. fernandezianum Broth. n. sp.

Robustiusculum, caespitosum, caespitibus densiusculis, pallide glauco-viridibus, dein lutescenti-viridibus, nitidis. Caulis erectus vel adscendens, usque ad 5 cm altus, basi fusco-tomentosus, inferne plerumque foliis destructis, dein dense foliosus, dichotome ramosus vel simplex. Folia falcatula, carinato-concava, e basi oblonga sensim lanceolato-subulata, c. 8 mm longa et c. 0,9 mm lata, superne argute serrata, limbata, limbo hyalino, inferne c. 0,5 mm lata, superne sensim angustiore; nervo tenui, in aristam plus minusve longam, argute

serratam excedente, dorso superne serrato; cellulis laminalibus linearibus, incrassatis, inter se porosis, basilaribus internis abbreviatis, luteis, alaribus numerosis, rotundato-hexagonis et quadratis, fusco-aureis. Caetera ignota.

Masatierra: inter valles Piedra agujereada et Laura, 650 m. s. m, ad truncos et ad terram (3). Salsipuedes; ad truncos; c. 960 m. s. m. (37).

Species *D. Dusenii* (Broth.) Broth. affinis, sed foliis haud fragilibus, superne argute serratis jam dignoscenda.

D. capillifolium (Broth.) Broth. comb. nov.

Leucoloma capillifolium Broth. in Arkiv för Botanik Bd. 4. N:o 1, p. 35 (1905).

Masatierra: In jugo Centinela; ad truncos (45). Co. Pirámide; ad truncos putridos; c. 600 m. s. m. (44). Salsipuedes; ad truncos putridos *Dicksoniae;* 660 m. s. m. (43).

Area: W. Patagonia, Chile.

D. capillifolioides Broth. n. sp.

Gracilescens, caespitosum, caespitibus densis, lutescenti-viridibus, hic illic inferne rubescentibus, nitidis. Caulis usque ad 3 cm altus, adscendens, parce radiculosus, dense foliosus, simplex vel ramosus. Folia falcata, canaliculato-concava, subconvolutacea, e basi breviter decurrente, lanceolata vel oblonga sensim longissime angustata, capillaria, usque ad 1,5 mm longa; nervo tenui, in aristam serrulatum longe excedente; cellulis laminalibus linearibus, inter se porosis, marginalibus inferioribus in pluribus seriebus angustissimis, limbum intus haud bene limitatum efformantibus; alaribus numerosis, magnis, subquadratis, saepe decoloratis. Caetera ignota.

Masafuera: Los Inocentes; ad truncum *Drimydis* in Dicksonieto; 950—1000 m. s. m. (46).

Species praecedenti affinis, sed foliis cellulis ubique linearibus nec superne abbreviatis dignoscenda.

D. Menziesii (Tayl.) Par.

Masatierra: El Yunque, ad truncos; 4—500 m. s. m. (508).

Area: Chile, East Australia, Tasmania, New Zealand, Auckland and Norfolk Isl.

var. *fernandezianum* Card. in Soc. Havr. p. 4 (1921).

Folia longiora (10 mm), marginibus validius denticulatis, cellulis quadratis, majoribus (mediis 15 μ longis et 10 μ latis).

Masatierra: (BERTERO).

D. Billardieri (Schwaegr.) Par.

Masatierra: Sine loco designato (BERTERO); In jugo prope Pangal et Centinela; 795 m. s. m. (42). In silva secus viam ad Portezuelo (4). Portezuelo

de Villagra; ad rupes, 575—590 m. s. m. (5, 38, 39). Salsipuedes; in silva (6). Salsipuedes; in fruticeto jugi lapidosi; 615 m. s. m. (41); 625 m. s. m. (7, 40).

Masafuera: c. 1000 m. s. m. (SKOTTSBERG 1908).

Area: Peru, Chile, W. Patagonia, Fuegia, Falkland Isl., Australia, Tasmania, New Zealand, Auckland and Campbell Isl.

D. nigricaule (Aongstr.) Par.

Masafuera: Cerro Correspondencia; 1150 m. s. m. (43).

Area: Chile, W. Patagonia, Fuegia.

Campylopus Brid.

C. introflexus (Hedw.) Mitt.

Masatierra: Sine loco designato (BERTERO); ad terram ± apertam secus viam ad Portezuelo (8, 9). Portezuelo de Villagra; ad rupem praeruptam; c. 600 m. s. m. (10). Puerto Ingles; in jugo; 575 m. s. m. (56).

Area: Alabama, Brazil, Uruguay, Chile, Ascencion, St. Helena, Tristan da Cunha, Australia, Tasmania, New Zealand, Auckland, Campbell, Marion Isl.

C. truncatus C. Müll.

Masatierra: Sine loco designato (BERTERO).

Masafuera: c. 1000 m. s. m. (SKOTTSBERG 1908).

Area: Chile.

C. polytrichoides De Not.

Masatierra: Cordon escarpado, El Pico, ad moles.

Area: West and south Europe, Algier, Madeira, Azores.

C. (Palinocraspis) **aberrans** Broth. n. sp.

Dioicus; gracilescens, caespitosus, caespitibus densis, rigidis, superne lutescentibus vel rubescentibus, inferne nigrescentibus, opacis. Caulis erectus, 2—3 cm altus, fusco-tomentosus, dense et aequaliter foliosus, simplex vel ramosus, ramis fastigiatis. Folia sicca arcte imbricata, humida erecto-patentia, canaliculato-concava, e basi lineari sensim lanceolato-acuminata, mutica, obtusa vel pilo brevissimo, comalia pilo brevi, stricto, hyalino, serrulato terminata, 3—5 mm longa et usque ad 0,7 mm lata, marginibus integris; nervo basi tertiam partem vel paulum ultra folii occupante, continuo, dorso laevi, fasciculo stereidarum dorsali et ventrali instructo; cellulis laminalibus ultra medium folii rhombeis, incrassatis, lumine elliptico, inferioribus elongate rectangularibus,

teneris, hyalinis, secus margines alte adscendentibus, alaribus teneris, hyalinis vel fuscis, in ventrem dispositis. Sporogonia plura ex eodem perichaetio. Seta c. 3 mm alta, cygnea lutea, sicca demum flexuoso-erecta, fusca, superne scaberula. Theca erecta, regularis, breviter oblonga, atrofusca, plicata. Calyptra cucullata, basi fimbriata.

Masatierra: In jugo Centinela; 530 m. s. m. (14). In jugo inter Pangal et vallem Anson, inter moles; 360 m. s. m. (51). Ad terram subapertam reg. silv. secus viam ad Portezuelo (11, 12). Salsipuedes, in campo 500 m. s. m. (53), in fissuris rupium, c. 600 m. s. m. (50) nec non in fruticeto jugi lapidosi, 625 m. s. m. (13). Villagra, ad terram c. 200 m. s. m. (52). Tres Puntas (15, f. depauperata).

Masafuera: ad saxa et rupes in valle Casas (16). Lobería, in litore marino (47). In campo supra Chozas, c. 850 m. s. m. (49, forma). Los Inocentes, loco aperto Dicksonieti, 8—950 m. s. m. (48).

var. **viridis** Broth. n. var.

Caespites laete virides, nitidiusculi. Folia sicca suberecta, haud imbricata, longius et angustius acuminata, nervo angustiore. Sterilis.

Masatierra: Cordón de los Chifladores; in silva sat aperta; c. 350 m. s. m. (17).

Species valde peculiaris, nervo stereideis ventralibus instructo jam dignoscenda.

C. areodictyon (C. Müll.) Mitt.

Masafuera: Cerro Correspondencia; ad ligna putrida; 1100 m. s. m. (18).

Area: Guatemala, Venezuela, New Granada, Ecuador, Bolivia.

C. (Atrichi) **subareodictyon** Broth. sp. nov.

Dioicus; gracilis, caespitosus, caespitibus laxis, laete viridibus, nitidiusculis. Caulis erectus, vix ultra 2 mm altus, fusco-tomentosus, dense foliosus, simplex. Folia patentia, sicca erectiora, canaliculato-concava, e basi oblonga sensim elongate lanceolato-subulata, c. 3 mm vel paulum ultra longa et usque ad 0,3 mm lata, marginibus superne subconniventibus ibidemque serrulatis; nervo basi dimidiam partem folii occupante, breviter excedente, cellulis dorsalibus stereideis, ventralibus laxis, inanibus; cellulis laminalibus minutis, quadratis, chlorophyllosis, dein breviter rectangularibus, basilaribus rectangularibus, teneris, hyalinis, marginalibus angustioribus, alaribus paucis, teneris, fragilibus. Caetera ignota.

Masafuera: ad truncos ± putridos in silva inter Sanchez et Toltén; 515 m. s. m. (19).

Species praecedenti valde affinis, sed foliis angustioribus, superne serrulatis, nervo angustiore cellulisque laminalibus superioribus quadratis dignoscenda.

C. (Atrichi) **blindioides** Broth. n. sp.

Gracilis, caespitosus, caespitibus densis, viridibus, opacis. Caulis erectus, usque ad 2 cm altus, parce fusco-radiculosus, dense et aequaliter foliosus, simplex. Folia sicca suberecta, humida erecto-patentia, canaliculato-concava. e basi ovata vel breviter oblonga sensim lanceolata-subulata, usque ad 4 mm longa, superne minute serrulatis; nervo basi tertiam partem folii occupante continuo, cellulis dorsalibus stereideis, ventralibus laxis, inanibus; cellulis laminalibus rhombeis, haud incrassatis, superioribus minoribus, dein sensim majoribus, basilaribus multo majoribus, laxe rectangularibus, teneris, hyalinis, alaribus laxis, teneris, hyalinis, in ventrem dispositis. Caetera ignota.

Masafuera: Quebrada de las Vacas; ad saxa cataractae (60).

Species habitu *Blindiis* nonnullis similis.

Thysanomitrium Schwaegr.

Th. Richardi Schwaegr.

Masatierra: In trajectu Villagra; ad rupes praeruptas; c. 600 m. s. m. (20, 21, 22). Ad rupem secus viam ad Portezuelo; c. 475 m (23). Ad antrum Robinsonii dictum (forma).

Masafuera: Correspondencia; ad terram; 1100 m. s. m. (24). Supra Chozas; ad terram; c. 850 m. s. m. (26). Cordón del Barril; ad terram lapidosam (25). Quebrada de las Casas (203 p. p.).

Area: Costarica, Guadaloupe, Brazil, New Granada, Ecuador, Peru, Chile.

Th. leptodus (Mitt.).

Masatierra: Sine loco designato (Moseley).

Masafuera: C. 1000 m (Srottsberg 1908).

Area: Chile, New Zealand.

Dicnemonaceae.

Eucamptodon Mont.

E. perichaetialis Mont.

Masafuera: Cordón del Barril; ad truncum *Drimydis* (31).

Area: Chile.

Fissidentaceae.

F. (Bryoideum) **fernandezianus** Broth. n. sp. — Plate 26, fig. 1—4.

Gracilis, caespitosus, caespitibus densis, rigidis, viridissimis, opacis. Caulis procumbens, vix ultra 1 cm altus, cum foliis usque ad 2 mm latus, basi fusco-

radiculosus, densa foliosus, plerumque simplex. Folia multijuga. sicca homomallula, humida stricta, erecto-patentia, infima minuta, dein raptim multo majoria, aequalia, lanceolato-ligulata, apiculata, integra, ubique limbata, limbo angustissimo, hyalino, lamina vera ultra medium folii producta, lamina dorsali ad basin nervi enata ibidemque rotundata; nervo albido, subcontinuo; cellulis minutissimis; rotundatis, chlorophyllosis, laevissimis. Caetera ignota.

Masatierra: Valle de Anson prope Plazoleta; ad saxum humo obtectum; c. 250 m. s. m. (86).

Masafuera: Quebrada de la Lobería; ad terram et saxa; c. 280 m. s. m. (85).

Species valde peculiaris, habitu amblyothallioideo oculo nudo jam dignoscenda.

F. (Pachylomidium) **crassicuspes** Broth. sp. nov. — Plate 26, fig. 5—8.

Tenellus, gregarie crescens, mollis, laete viridis, opacus. Caulis vix ultra 3 mm altus, cum foliis c. 2 mm latus, infima basi fusco-radiculosus, dense foliosus, simplex. Folia c. 7 juga, sicca vix mutata, erecto-patentia, stricta, intima minuta, dein raptim multo majora, inferiora late lanceolata, comalia longiora, lineari-lanceolata, omnia in aristam contracta, ubique limbata, limbo crasso, continuo; lamina vera ultra medium folii producta, lamina dorsalis ad basin nervi enata ibidemque angustata; nervo albido, excedente unacum limbo confluente aristam crassam efformante; cellulis laminalibus angulato-rotundatis, basilaribus internis oblongis, omnibus laevissimis. Caetera ignota.

Masatierra: V. Colonial, Quebrada seca; ad terram; 435 m. s. m. (26).

Species *F. crassipedi* Wils. affinis, sed foliis aristatis jam dignoscenda.

F. rigidulus Hook. fil. et Wils.

Masatierra: Quebrada Damajuana; ad saxa cataractae (63). Pangal; ad saxa cataractae; 205 m. s. m. (64). Quebrada Juanango; ad cataractam (375). Cerro Chumacera; ad rupem humidam (65),

Masafuera: Quebrada de las Casas (27). Quebrada de las Vacas; ad saxa cataractae (28). Quebrada de la Lobería; in rivulo (99).

Area: Ecuador, Chile, W. Patagonia, Australia, Tasmania, New Zealand.

F. leptochaete P. Dus.

Masatierra: Valle Colonial, Quebrada seca; ad terram unacum *F. crassicuspide* parcissime (26 p. p.).

Area: Chile.

F. maschalanthus Mont.

Masatierra: Quebrada Damajuana; 345 m. s. m. (374). Valle de Anson pr. Plazoleta; ad saxum humo obtectum; c. 250 m. s. m. (91). Cumberland Bay;

ad parietem cavernae (27, 28, 66/68, 92/98). Ad terram humidam, humosam secus viam ad Portezuelo; c. 450 m. s. m. (30). Portezuelo de Villagra; ad rupem praeruptam; 570 m. s. m. (70).

Masafuera: Quebrada del Mono; ad terram in angustiis; 570 m. s. m. (29). Quebrada da las Casas; ad rupem (73). Quebrada del Blindado; ad terram et ad saxa; 440 m. s. m. (72). Correspondencia; 1150 m. s. m. (71).

Area: Chile, W. Patagonia.

F. (Amblyothallia) **pycnotylus** Broth. sp. nov. — Plate 26, fig. 9—12.

Gracilescens, caespitosus, caespitibus rigidis, densis, late extensis, fuscescenti-viridibus, opacis. Caulis erectus, vix ultra 1 cm altus, cum foliis c. 3 mm latus, infima basi fusco-radiculosus, dense foliosus, plerumque simplex. Folia c. 12 juga, erecto-patentia, sicca homomalla, infima minuta, dein raptim multo majora, ligulata, obtusissima, crenulata, elimbata; lamina vera ultra medium folii enata; lamina dorsalis paulum ultra basin nervi enata; nervo crassissimo, rufescente, infra apicem folii evanido; cellulis laminalibus angulato-rotundatis, basilaribus externis angustis, omnibus pellucidis, laevissimis. Caetera ignota.

Masatierra: Ad rupes praeruptus in trajectu Villagra; c. 600 m. s. m. (30, 69).

Species praecedenti valde affinis, sed foliis nervo multo crassiore dignoscenda.

F. asplenioides (Sw.) Hedw.

Masatierra: Sine loco designato (BERTERO, E. C. REED).

Area: Costarica, Jamaica, New Granada, Ecuador, Peru, Brasilia, Madeira, Canary Isl., W. Africa, Sumatra, Java, Lombok, Queensland.

Leptodontium Hamp.

L. fernandezianum Broth. n. sp. — Plate 26, fig. 13—15.

Robustiusculum, caespitosum, caespitibus densis, mollibus, late extensis, ochraceis. Caulis erectus, usque ad 11 cm altus, flexuosus, vix radiculosus, dense foliosus, dichotome ramosus. Folia sicca adpressa, crispata, humida carinato-concava, e basi brevi, erecta, superne dilatata sensim in laminam patentem, lanceolatam attenuata, c. 5 mm longa, marginibus ultra medium folii late revolutis, dein erectis, minute et irregulariter serrulatis; nervo luteo, infra summum apicem folii evanido, dorso papilloso; cellulis laminalibus minutis, rotundatis, incrassatis, verrucosis, pellucidis, basilaribus angustissime linearibus, superioribus seriatim papillosis, inferioribus luteis, laevissimis. Caetera ignota.

Masafuera: Correspondencia; in campo; c. 1400 m. s. m. (105).

Species *L. luteo* (Tayl.) Mitt. affinis, sed foliis superne minute et irregulariter serrulatis, pellucidis dignoscenda.

Didymodon Hedw.

D. (Erythrophyllum) **calymperidictyon** Broth. n. sp. — Plate 26, fig. 16—20.

Tenellus, caespitosus, caespitibus laxiusculis, glaucoviridibus. Caulis erectus, vix ultra 2 mm altus, basi fusco-radiculosus, dense foliosus, simplex. Folia sicca crispatula, humida patentia, subcarinato-concava, infima minuta, dein sensim majora, linearia, obtusiuscula, mucronata, usque ad 1,4 mm longa et c. 0,25 mm lata, marginibus erectis, apice dentibus paucis aculeiformibus instructis; nervo rufescente, infra summum apicem folii evanido, dorso superne scabro; cellulis laminalibus angulato-rotundatis, chlorophyllosis, dense verrucosis, subobscuris, basilaribus internis laxis, teneris, oblongo-hexagonis, hyalinis, externis linearibus, limbum brevem 3—4 seriatum, lutescentem efformantibus. Caetera ignota.

Masatierra: Quebrada Damajuana; ad terram; 345 m. s. m. (107).

Species distinctissima, foliorum forma et areolatione dignoscenda.

D. (Erythrophyllum) **linearis** Broth. n. sp.

Gracilis, caespitosus, caespitibus densis, rufescentibus. Caulis erectus, usque ad 1 cm altus, inferne fusco-tomentosus, dense foliosus, simplex. Folia sicca crispula, humida erecto-patentia, carinato-concava, linearia, acutiuscula, mucronata, usque ad 2 mm longa et c. 0,3 mm lata, marginibus erectis, apice dentatis; nervo rufescente, infra summum apicem folii evanido, dorso superne scabro; cellulis laminalibus minutis, quadratis, verrucosis, subobscursis, basilaribus internis laxis, teneris, breviter rectangularibus, externis in seriebus nonnullis linearibus, laevissimis. Caetera ignota.

Masafuera: Ad rivulum prope Correspondencia; 1100 m. s. m. (380).

Species distinctissima, cum *D. rubello* (Hoffm.) Bryol. eur. et *D. alpigenae* Vent. comparanda, sed foliis linearibus, marginibus erectis jam dignoscenda.

Tortula Hedw.

T. scabrinervis (C. Müll.) Mitt.

Masatierra: Portezuelo de Villagra; ad rupes; 590 m. s. m. (121).

Area: Chile.

T. flagellaris (Schimp.) Mont.

Masatierra: Sine loco designato (BERTERO).

Area: Chile.

Grimmiaceae.

Grimmia Ehrh.

G. phyllorhizans Broth. n. sp. — Plate 26, fig. 21—24.

Dioica? tenella, pulvinata, pulvinulis parvis, griseis. Caulis erectus, vix ultra 3 mm altus, infima basi parce fusco-radiculosus, dense foliosus, ramosus.

Folia sicca laxe imbricata, humida suberecta, unistratosa, superne filis numerosis, dense ramosis, fuscis instructa, oblonga vel oblongo-lanceolata, obtusa, infima minuta, mutica, superiora multo majora, usque ad 1 mm vel paulum ultra longa, pilo longissimo, serrulato terminata, marginibus erectis, integris; nervo tenui, continuo; cellulis laminalibus minutissimis, quadratis, haud sinuosis, chlorophyllosis, laevissimis, basilaribus multo majoribus, internis breviter rectangularibus, marginalibus in pluribus seriebus quadratis, pellucidis. Bracteae perichaetii foliis similes. Seta cygnea, 2,5 mm vel paulum ultra alta, tenuis, lutea. Theca minutissima, ovalis, sicca indistincte costata, fuscidula. Operculum alte convexum, obtusum. Calyptra ignota.

Masatierra: Villagra; ad saxa (129).

Species pulchella, minutie omnium partium oculo nudo jam dignoscenda, *Gr. Donianae* Sm. habitu similis.

Rhacomitrium Brid.

R. subnigritum (C. Müll.) Par.

Masatierra: Quebrada de las Vacas; ad moles rivuli (130, 131).
Masafuera: Correspondencia; ad moles rivuli; 1100 m. s. m. (132).

Area: W. Patagonia, Fuegia.

R. symphyodontum (C. Müll.) Jaeg.

Masatierra: Portezuelo de Villagra, ad rupes praeruptas; 575 m. s. m. (133) et c. 600 m. s. m. (134). Salsipuedes; in jugo lapidoso; 625 m. s. m. (144).

Masafuera: Cerro Correspondencia; ad moles campestres; c. 1400 m. s. m. (135, 136). Correspondencia; ad moles campestres; c. 1200 m. s. m. (146), c. 1350 m. s. m. (137), 1360 m. s. m. (138) et c. 1400 m. s. m. (139). Correspondencia; ad rivulum; c. 1100 m. s. m. (140). In terra substerili prope Las Torres; c. 1360 m. s. m. (141).

Area: Chile, W. Patagonia, Fuegia, Falkland Isl., Tasmania, New Zealand.

R. striatipilum Card.

Masafuera: In jugo supra Quebrada del Pasto; ad moles; c. 1250 m. s. m. (142). Prope Las Torres; ad rupes; c. 1370 m. s. m. (143).

Area: Chile, Fuegia, South Georgia.

R. lanuginosum (Hedw.) Brid.

Masafuera: In cacumine montis Inocentes; in campo; c. 1500 m. s. m. (145). Correspondencia; in campo; c. 1400 m. s. m. (146) et 1360 m. s. m. (285).

Area: Cosmopolitan.

R. loriforme Dus.

Masafuera: Correspondencia; in campo; c. 1350 m. s. m. (147). Paseo de las Cabras; in campo; 11—1200 m. s. m. (148).

Area: W. Patagonia.

R. convolutum Mont.

Masafuera: c. 1000 m. s. m. (SKOTTSBERG 1908).

Area: Chile.

Ptychomitriaceae.

Ptychomitrium (Bruch.) Fürnr.

P. fernandezianum (Mitt.) Jaeg.

Masatierra: Sine loco designato (BERTERO, MOSELEY). Salsipuedes; ad rupes; c. 500 m. s. m. (122). Villagra; ad moles (123).

Masafuera: Ad rupes litoreas inter Casas et Mono (127). Ensenada Toltén; ad moles (128).

var. **majus** Broth. n. var.

Folia longiora (c. 3 mm), angustius acuminata. Seta c. 5 mm alta. Theca major.

Masatierra: Quebrada Damajuana; 345 m. s. m. Quebrada del Monte Maderugo; ad rupem praeruptam (124).

Masafuera: In valle Casas; ad saxa et rupes (125, 126).

Area: Endemic.

Orthotrichaceae.

Zygodon Hook. et Tayl.

Z. obovalis Mitt. in Hemsley, Challenger Rep. Bot. I, p. 79.

Masatierra: (E. C. REED).

Z. Menziesii (Schwaegr.) W.-Arn.

Masatierra: Valle Anson, prope Plazoleta; ad truncos putridos; 260 m. s. m. (371).

Area: Chile, East Australia, Tasmania, New Zealand.

Stenomitrium (Mitt.) Broth.

S. pentastichum (Mont.) Broth.

Masafuera: Las Torres; ad rupes; 1350 m. s. m. (156). In campo prope Correspondencia; c. 1100 m. s. m. (152) et c. 1400 m. s. m. (157). Cordón del Barril; ad rupes; 900—1000 m. s. m. (153) et ad truncos (154). In cacumine montis Inocentes; 1480 m. s. m. (155, 159). In jugo in viciniis montis Inocentes; ad truncos *Drimydis;* c. 1000 m. s. m. (158).

Area: Chile und W. Patagonia.

Ulota Mohr.

U. rufula (Mitt.) Jaeg.

Masafuera: Cordón de Barril; ad truncos *Drimydis* (165).

Area: Chile.

Macromitrium Brid.

M. hymenostomum Mont.

Masatierra: In jugo prope Tres Puntas (159).

Area: Chile.

M. saxatile Mitt.

Masatierra: Sine loco designato (BERTERO); ad truncos *Drimydis* secus viam ad Portezuelo (160). Portezuelo de Villagra; ad truncos *Drimydis;* 575 m. s. m. (161). Salsipuedes; in fruticeto; 625 m. s. m. (162).

Masafuera: In monte Inocentes; ad truncos *Drimydis*. In jugo in viciniis montis Inocentes; ad truncos *Drimydis;* c. 950 m. s. m. (163, 164).

Area: Endemic.

M. (Goniostoma) **fernandezianum** Broth. n. sp. — Plate 26, fig. 25—28.

Gracilescens, caespitosum, caespitibus densis, rigidis, late extensis, viridibus, aetate fuscescentibus, opacis. Caulis elongatus, repens, dense ramosus, ramis 5—10 mm longis, erectis vel adscendentibus, dense foliosis, simplicibus vel parce ramulosis, obtusis. Folia ramea sicca ± distincte spiraliter contorta, humida erecto-patentia, carinato-concava, anguste lanceolata, acutiuscula vel obtusiuscula, 2—2,5 mm longa, integerrima; nervo crassiusculo, infra summam apicem folii evanido; cellulis laminalibus rotundatis, haud incrassatis, c. 0,010 mm, pellucidis, laevissimis, basilaribus internis ovalibus, marginalibus in seriebus

nonnullis linearibus, ad plicas papillis altis instructis. Bracteae perichaetii foliis similes. Seta c. 3 mm alta, tenuis, rubra, laevissima. Theca minuta, ovalis, fusco-rubra, laevissima, microstoma, ore laevi. Peristomium O. Calyptra nuda.

Masatierra: Puerto Frances, Loma Incienso; ad truncum *Myrceugeniae* (172). In jugo inter valles Piedra agujereada et Laura; 650 m. s. m. (171). In declivi septemtrionali montis Yunque; ad truncos arborum silvae; 4—500 m. s. m. (166). Valle Colonial, Quebrada seca; ad truncos arborum; 435 m. s. m. (167). Portezuelo de Villagra; ad *Berberidem;* c. 600 m. s. m. (170). Salsipuedes; ad *Myrceugeniam* (169). Puerto Ingles; in silva sicca jugi lapidosi; c. 550 m. s. m. (168).

Species *M. asperulo* Mitt. affinis, sed foliis cellulis laminalibus pellucidis, laevissimis, basilaribus internis ovalibus nec non theca multo minore, ore laevi dignoscenda.

M. (Goniostoma) **Masafuerae** Broth. n. sp. — Plate 26, fig. 29, 32.

Gracile, caespitosum, caespitibus densiusculis, viridibus, opacis. Caulis elongatus, repens, dense ramosus, ramis erectis, vix ultra 2 mm longis, dense foliosis, simplicibus, obtusis. Folia sicca indistincte spiraliter contorta, humida erecto-patentia, carinato-concava, lineari-lanceolata, obtusa, mucronata, c. 1,7 mm longa, integerrima; nervo crassiusculo, infra summum apicem folii evanido; cellulis laminalibus quadratis, 0,005—0,007 mm, haud incrassatis, laevissimis, basilaribus internis ovalibus, marginalibus in seriebus nonnullis linearibus, ad plicas sublaevibus. Bracteae perichaetii foliis similes. Seta 3—4 mm alta, tenuis, rubra, laevissima. Theca minuta, ovalis, fusco-rubra, laevissima, microstoma, ore laevi. Peristomium simplex. Exostomii dentes pallidi, papillosi. Calyptra subnuda.

Masafuera: Quebrada del Mono; ad truncos *Myrceugeniae;* 475 m. s. m. (173).

Species praecedenti affinis, sed foliorum forma, cellulis laminalibus minoribus, basilaribus ad plicas sublaevibus peristomioque facillime dignoscenda.

Funariaceae.

Funaria Schreb.

F. hygrometrica (L.) Sibth.

Masatierra: Cordón Centinela; loco deusto (174). Valle Colonial. Puerto Ingles.

Masafuera: Quebrada de las Casas; ad saxa (226, 231).

Area: Cosmopolitan.

Bryaceae.

Mielichhoferia Hornsch.

M. longiseta C. Müll.

Masatierra: Sine loco designato (MOSELEY in HEMSLEY, Challenger Report Bot. I.).

Area: Ecuador.

Bryum Dill.

B. Lechleri C. Müll.

Masafuera: Quebrada de las Casas (SKOTTSBERG 1908).

Area: Chile.

B. (Apalodictyum) **fernandezianum** Broth. n. sp.

Dioicum; tenellum, caespitosum, caespitibus densis, late extensis, laete viridibus, nitidiusculis. Caulis erectus, vix ultra 1 cm altus, inferne fusco-tomentosus, dense foliosus, innovando ramosus, innovationibus brevibus, erectis, aequaliter foliosis. Folia caulina sicca imbricata, humida erecto-patentia, carinato-concava, infima minuta, superiora sensim majora, oblonga, breviter acuminata, aristata, lamina usque ad 1,3 mm longa et usque ad 0,5 mm lata, marginibus erectis, integerrimis; nervo crassiusculo, rufescente, in aristam longiusculam, integram excedente; cellulis oblongo-hexagonis, teneris, basilaribus rectangularibus, marginalibus angustis, limbum indistinctum efformantibus. Folia innovationum minora, brevius aristata. Caetera ignota.

Masatierra: Puerto Ingles, in declivi litorali humido (189).

Masafuera: In caverna litorali pr. vallem Casas (183). Quebrada de las Vacas; ad terram (187).

Species *Br. Crügeri* Hamp. affinis, sed foliis nervo crassiusculo in aristam excedente instructis dignoscenda.

Leptostomaceae.

Leptostomum R. Br.

L. Menziesii (Hook.) R. Br.

Masafuera: Cordón del Barril; ad truncos *Drimydis Winteri* (196).

Area: Patagonia, Fuegia.

Eustichiaceae.

Eustichia (Brid.) Mitt.

E. Poeppigii (C. Müll.) Par.

Masatierra: Puerto Ingles; ad rupes praeruptas; c. 450 m. s. m. (149). Portezuelo de Villagra; ad rupes in silva; c. 575 m. s. m. (150, 367).

Masafuera: Quebrada de las Vacas; ad rupes humidas (151). Quebrada de las Casas; ad rupes et ad saxa (194).

Area: Chile, W. Patagonia.

Rhizogoniaceae.

Rhizogonium Brid.

Rh. Novae Hollandiae Brid. var. **patagonicum** Card. et. Broth.

Masatierra: Cordón Salsipuedes; raro; 660 m. s. m. (190).

Area: Patagonia.

Rh. mnioides (Hook.) Schimp.

Masafuera: Quebrada de las Casas; c. 200 m. s. m. (192). Campo Correspondencia; 1150 m. s. m. (191). Cordón del Barril; ad truncos *Dicksoniae;* 900—1000 m. s. m. (193).

Area: New Granada, Chile, Patagonia, Fuegia, Australia, Tasmania, New Zealand.

Bartramiaceae.

Anacolia Schimp.

A. subsessilis (Tayl.) Broth.

Masatierra: Portezuelo de Villagra; ad rupes; 590 m. s. m. (210).

Area: New Granada, Ecuador.

var. **brevifolia** Broth. n. var.

A typo foliis brevioribus, siccis adpressis differt. Sporogonia ignota.

Masatierra: Inter Villagra et Tres Puntas (358).

Masafuera: Quebrada de las Casas; ad moles (201, 203 p. p.). Inter Casas et Papal; ad rupes; c. 200 m. s. m. (202).

Bartramia Hedw.

B. aristata Schimp.

Masatierra: Puerto Ingles; ad rupes; c. 450 m. s. m. (198).

Masafuera: Quebrada del Blindado; ad rupes; 440 m. s. m (197). Las Torres; 1380 m. s. m. (206). Campo Correspondencia; 1100 m. s. m. (204, 205, 208, 209).

Area: Chile.

B. patens Brid.

Masafuera: Las Torres; ad rupes; 1370 m. s. m. (198, 207).

Area: Patagonia, Fuegia, Falkland Isl., South Georgia, Kerguelen.

B. fernandeziana Card. in Soc. Havr. p. 7 (1921).

Masatierra: Sine loco designato (BERTERO).

Area: Endemic.

Philonotis Brid.

Ph. Krauseana (C. Müll.) Jaeg.

Masatierra: Valle Colonial; ad parietes cavernae humidas (212, 364).

Masafuera: Quebrada de la Lobería; in rivulo (99 p. p.).

Area: Chile.

var. **longinervis** Broth. n. var.

A typo foliis angustius reticulatis, nervo excedente differt.

Masatiera: Pangal; ad cataractam; 205 m. s. m. (214).

Ph. glabrata Broth. n. sp.

Dioica. Gracilis, caespitosa, caespitibus densis, mollibus, late extensis, laete viridibus. Caulis erectus, usque ad 3 cm altus, fusco-tomentosus, dense foliosus, ± ramosus vel simplex. Folia erecto-patentia, sicca erectiora, ovato-lanceolata, cristata, marginibus erectis, superne simpliciter serrulatis; nervo crasso, in aristam elongatam, rigidam, serrulatam excedente, dorso superne serrulato; cellulis superioribus anguste rectangularibus, basin versus laxioribus, omnibus laevibus. Caetera ignota.

Masatierra: Pangal; ad rupes (363).

Species praecedenti affinis, sed foliis nervo crasso longe aristatis cellulisque laevibus dignoscenda.

Ph. scabrifolia (Hook. fil. et Wils.) Broth.

Masatierra: Portezuelo de Villagra; 450—500 m.

Masafuera: Quebrada del Mono. Campo Correspondencia; 1100 m. s. m.

(362). In rupibus ad viam inter Quebrada de las Casas et Papal; c. 200 m. s. m. (217).

Area: Ecuador, Peru, Chile, Patagonia, Fuegia, Falkland Isl., South Africa, Australia, Tasmania, New Zealand, Auckland, Marion, Kerguelen, South Georgia.

Ph. vagans (Hook. fil. et Wils.) Mitt.

var. **evanidinervis** Broth. n. var.

A typo foliis laxius areolatis, nervo infra apicem folii evanido differt.

Masafuera: Quebrada de la Lobería; ad rivulos (215).

Area of typical *Ph. vagans:* Chile, South Georgia.

Breutelia Schimp.

B. Masafuerae Broth. n. sp.

Gracilescens, rigida, lutescens, nitida, aliis muscis immixta. Caulis erectus vel adscendens, usque ad 8 cm altus, haud tomentosus, densiuscule foliosus, vage ramosus, superne simplex vel ramis paucis, subfloralibus instructus. Folia e basi brevi, superne dilatata, plicata in laminam patulam, strictam, plicatam, anguste lanceolato-subulatam, c. 4 mm longam attenuata, marginibus basi anguste revolutis, superne minutissime serrulatis; nervo sat tenui, ± longe excedente; cellulis linearibus, incrassatis, lumine angustissimo, laevibus, basilaribus externis in seriebus paucis breviter rectangularibus, hyalinis, basilaribus infimis fuscoaureis. Caetera ignota.

Masafuera: Correspondencia, in campo; 1350 m. s. m. (366).

Species foliis minutissime serrulatis, cellulis incrassatis, lumine angustissimo, laevibus dignoscenda.

Hedwigiaceae.

Rhacocarpus Lindb.

Rh. Humboldtii (Hook.) Lindb.

Masafuera: Las Torres; ad rupes praeruptas (236) et ad rupes humidas (231); c. 1370 m. s. m.

Area: W. South America from New Granada to Fuegia, E. Africa, Reunion, Madagascar.

Cryphaeaceae.

Dendrocryphaea Par. et Schimp.

D. cuspidata (Sull.) Broth.

Masafuera: Quebrada de las Casas (SKOTTSBERG 1908).
Area: Chile.

Cyptodon Par. et Schimp.

C. crassinervis Broth. n. sp.

Autoicus; gracilescens, caespitosus, caespitibus densis, rigidiusculis, fuscescentibus, superne lutescentibus, vix nitidiusculis. Caulis fluitans, usque ad 8 cm longus, dense foliosus, ± regulariter pinnatim ramosus, ramis patentibus, brevibus, simplicibus, singulis longioribus, ± ramulosis. Folia sicca imbricata, humida erecto-patentia, ovata, breviter acuminata, acuta, c. 2 mm longa, marginibus erectis, apice minutissime serrulatis; nervo crasso, infra apicem folii evanido; cellulis laminalibus paulum incrassatis, lumine ovali, basilaribus internis linearibus, externis quadratis et transverse latioribus. Bracteae perichaetii erectae, sensim acuminatae, integrae, nervo crasso, longe excedente aristatae. Theca immersa, ovali. Peristomium luteum, minute papillosum; exostomii dentes lanceolati; endostomium exostomii longitudinis, processibus angustis. Caetera ignota.

Masafuera: In valle Casas, ad cataractas (341).

Species *C. dilatato* (Hook.) fil. et Wils. valde affinis, sed foliis angustioribus, acutis, nervo crassiore distinguenda.

Lepyrodontaceae.

Lepyrodon Hamp.

L. parvulus Mitt.

Masatierra: Sine loco designato (E. C. REED); Cordón Chifladores; ad truncos; 3—400 m. s. m. (338). Quebrada de la Damajuana; in silva (233, forma). Infra trajectum Portezuelo; ad rhizomata *Polypodii intermedii* (248). Puerto Ingles; ad truncos in silva sicca; c. 550 m. s. m. (232).

Masafuera: Sine loco designato (CUMING). Quebrada del Mono; ad truncum; 457 m. s. m. (505 p. p.). Quebrada de las Chozas; ad truncos (336). Inter Sanchez et Toltén; ad truncos et ramos arborum; 515 m. s. m. (335, 337).

Area: Chile.

L. tomentosus (Hook.) Mitt.

Masatierra: In jugo inter valles Piedra agujereada et Laura; 650 m. s. m. (339). El Yunque, in declivi meridionali; ad truncos in silva; 4—500 m. s. m. (234).

Area: New Granada, Ecuador, Peru, Argentina, Brazil.

L. implexus (Kunz.) Par.

Masatierra: El Yunque, in declivi meridionali; ad truncum *Drimydis;* c. 450 m. s. m. (248 bis).

fo. **flagellifera.**

Rami partim in flagellum ± elongatum, simplex vel ramosum attenuati.

Masatierra: Cerro Pirámide, in declivi boreali; 600 m. s. m. (250). Salsipuedes; in Dicksonieto parce; 660 m. s. m. (249).

Area: Chile, W. Patagonia, Fuegia.

Ptychomniaceae.

Ptychomnium Hook. fil. et Wils.

P. subaciculare Besch.

Masatierra: In declivi meridionali supra Pangal; 795 m. s. m. (243). Cordón Centinela; in fruticeto; 530 m. s. m. (354). Salsipuedes; in fruticeto lapidoso jugi; 625 m. s. m. (242, 244, 353) et in silva (355).

Area: Chile, Patagonia, Fuegia.

P. falcatulum Broth. n. sp. — Plate 26, fig. 33—35.

Robustiusculum, caespitosum, caespitibus densiusculis, lutescentibus nitidiusculis. Caulis adscendens vel flexuosus, dense foliosus, vage ramosus. Folia patentia, superiora ± distincte falcatula, basi pluries plicata, ovalia, subsensim in acumen lanceolato-subulatum, inaequaliter serratum attenuata; nervis indistinctis; cellulis laminalibus incrassatis, inter se porosis, lumine lineari, basilaribus infimis abbreviatis, fusco-aureis. Seta c. 1,5 cm alta tenuis, nigrescens. Theca inclinata vel subhorizontalis, oblongo-cylindrica, subarcuata, profunde plicata. Operculum e basi cupulata aciculare.

Masatierra: In jugo inter valles Piedra agujereada et Laura; 650 m. s. m. (356).

Species praecedenti affinis, sed foliis erectioribus, superioribus falcatulis nec non seta breviore dignoscenda.

var. **gracilescens** Broth. n. var.

Gracilescens. Folia vix vel indistincte falcatula, ovalia, raptim in acumen plerumque minutius serrulatum attenuata. Sporogonia ut in typo.

Masatierra: In jugo inter Quebrada de la Piedra agujereada et Quebrada Laura; 650 m. s. m. (245).

P. ptychocarpum (Schwaegr.) Mitt.

Masafuera: Correspondencia; in campo; c. 1200, 1350 m. s. m. (246, 335). In cacumine montis Inocentes; in campo; 1480 m. s. m. (247).

Area: Chile, W. Patagonia.

Neckeraceae.

Weymouthia Broth.

W. mollis (Hedw.) Broth.

Masatierra: Sine loco designato (BERTERO); Portezuelo de Villagra; ad rupes praeruptas; c. 600 m. s. m. (327) et c. 450 m. s. m. Cordón Salsipuedes; 625 m. s. m. (253).

Masafuera: Quebrada del Varadero; c. 950 m. s. m. (251). Inter Sanchez et Toltén; ad truncos et ramos arborum; 515 m. s. m. (328, 329).

Area: Chile, East Australia, Tasmania, New Zealand.

Leptodon Mohr.

L. Smithii (Dicks.). Mohr.

Masatierra: Sine loco designato (E. C. REED).

Masafuera: In planitie inter Sanchez et Toltén, ad truncos et ramulos, 515 m. s. m. (382).

Area: Europe, Caucasus, Canary Isl., Africa, Kilimandscharo, Chile, Argentina, East Australia, New Zealand.

Neckera Hedw.

N. rotundata Broth. n. sp. — Plate 27, fig. 11—13.

Dioica; gracilescens, lutescenti-viridis, nitidiuscula. Caules secundarii 3 cm vel paulum ultra alti, dense foliosi, complanati, cum foliis 4—5 mm lati, pinnatim ramosi, ramis patentibus, vix ultra 1 cm longis, vix attenuatis. Folia undulata, lateralia e basi oblonga ligulata, rotundato-obtusa, c. 3 mm longa et usque ad 0,95 mm lata, subintegra; nervis binis, brevissimis; cellulis laminalibus breviter linearibus, apicalibus rhombeis, alaribus minutis, ovalibus, aureis. Caetera ignota.

Masafuera: Quebrada del Mono; in silva ad basin arborum parce; 440 m. s. m. (275).

Species distinctissima, foliis rotundato-obtusis jam dignoscenda.

Porothamnium Fleisch.

P. fasciculatum (Sw.) Fleisch.

Masafuera: Quebrada de las Casas; ad terram sub *Blechnum longicauda;* c. 200 m. s. m. (270); ad rupem humidam (352) et ad margines cataractarum (351). Quebrada del Blindado; ad terram et ad saxa; 440 m. s. m. (272). Quebrada del Mono; in silva (267 p. p.).

Area: Jamaica, Portorico, Venezuela, New Granada, Peru, Brazil.

P. arbusculans (C. Müll. sub *Hypno*).

Masafuera: Quebrada de las Casas (SKOTTSBERG 1908).

Area: Chile, Patagonia.

Thamnium Bryol. eur.

Th. rigidum (Mitt.) Broth.

Masatierra: Sine loco designato (BERTERO, E. C. REED, MOSELEY).

Area: Endemic.

Th. latinerve (Mitt.). (*Porotrichum latinerve* Mitt. in HEMSLEY, Challenger Rep. Bot. I.).

Masatierra: (BERTERO, MOSELEY).

Area: Endemic.

Th. Caroli Broth. n. sp.

Robustum, rigidum, pallide viride, aetate lutescenti-viride vel pallide fuscescens, vix nitidiusculum. Caules secundarii 8—13 cm alti, stipitati, stipite 3—5 cm longo, foliis squamaeformibus, adpressis dense vestito, dein pinnatim ramosi, dense et complanate foliosi, cum foliis 4 mm vel paulum ultra lati, obtusi vel sensim attenuati, ramis infimis usque ad 9 cm longis, ± dense pinnatim ramulosis, superioribus multo brevioribus, simplicibus. Folia caulina erecto-patentia, concava, ovato-lanceolata, acuta vel acumine breviter ligulato, acutiusculo terminata, 3,5—4 mm longa, subintegra; nervo basi crassiusculo, dein sensim angustiore, infra apicem folii evanido; cellulis laminalibus incrassatis, apicalibus rhombeis, lumine elliptico, basilaribus linearibus, inter se porosis, lumine angustissimo. Folia ramea minora, apice dentibus singulis instructa.

Seta c. 7 mm alta, tenuis, rubra. Theca minuta, inclinata, oblonga, deoperculata atrofusca. Operculum ignotum.

Masatierra: Portezuelo de Villagra; ad terram; c. 600 m. s. m. (344). El Yunque; c. 450 m. s. m. (254); ad truncos.

Species *Th. rigido* (Mitt.) Broth. affinis, sed statura multo robustiore, caule remotius pinnato ramisque complanatis nec non foliis longius acuminatis, nervo superne sensim tenuiore dignoscenda.

Th. Ingae Broth. n. sp.

Robustiusculum, rigidum, pallide viride, nitidiusculum. Caules secundarii 6—10 cm alti, stipitati, stipite 1—3 cm longo, foliis squamaeformibus dense vestito, dein pinnatim ramosi, dense foliosi, valde complanati, cum foliis c. 3 mm lati, plerumque obtusi, ramis usque ad 3 cm vel paulum ultra longis, simplicibus vel subsimplicibus. Folia caulina erecto-patentia, concaviuscula, ovato-oblonga, angulo acutiusculo terminata, c. 2 mm longa, integra vel apice ± serrata; nervo basi crassiusculo, dein sensim angustiore, infra apicem folii evanido; cellulis laminalibus apicalibus incrassatis, rhombeis, caeteris haud incrassatis, basilaribus breviter linearibus. Folia ramea minora. Caetera ignota.

Masatierra: Puerto Frances; ad terram et saxa silvae; c. 500 m. s. m. (345) et ad pedem arborum (347). Quebrada de la Damajuana; ad truncos; (346). V. Colonial, Quebrada Gutierrez; ad arbores silvae; c. 500 m. s. m. (348). Quebrada Juanango; ad terram; c. 250 m. s. m. (255). Villagra, Quebrada Choza; ad truncos in silva; c. 250 m. s. m. (268). V. Colonial, Quebrada seca; ad saxa et ad pedem arborum; 435 m. s. m. (269, 349, fo. procerior, ramis infimis longioribus, pinnatim ramulosis).

Species praecedenti valde affinis, sed caule ramisque valde complanatis foliisque ovato-oblongis, angulo acutiusculo terminatis, cellulis superioribus tantum incrassatis dignoscenda.

Th. crassinervium Broth. in Engl.-Prantl Bryal. p. 862. *Porotrichum crassinervium* Mitt. in Herb.

Gracilescens, fuscescenti-viride, vix nitidiusculum. Caules secundarii c. 10 cm alti, stipitati, stipite c. 6 cm longo, foliis squamaeformibus dense vestito, dein pinnatim ramosi, dense foliosi vix complanati, ramis usque ad 2,5 cm longis, simplicibus. Folia erecto-patentia, concava, lanceolata, raptim in acumen breve, anguste serratum contracta, c. 2 mm longa; nervo crassissimo, ubique aequilato vel superne paulum latiore, infra summum apicem folii evanido; cellulis haud incrassatis, acuminis irregularibus, ovalibus vel triangularibus, caeteris hexagono-oblongis, basin versus sensim longioribus, infimis linearibus. Caetera ignota.

Masatierra: Sine loco designato (BERTERO); Quebrada Damajuana; ad cataractam; 248 m. s. m. (376, fo. foliis plurimis destructis). Portezuelo; c. 450 m. s. m.

Area: Endemic.

Th. proboscideum Broth. n. sp.

Gracilescens, sordide viridissimum, opacum. Caules secundarii usque ad 7 cm alti, stipitati, stipite usque ad 3 cm longo, foliis squamaeformibus dense vestito, dein pinnatim ramosi, ramis usque ad 3 cm longis, simplicibus vel infimis subpinnatim ramulosis. Folia erecto-patentia, concaviuscula, lanceolata, apice plerumque excisa ibidemque minute serrulata, nervo longe excedente terminata, c. 2 mm longa; nervo crassissimo, ubique aequilato, longe excedente; cellulis haud incrassatis, acuminis irregularibus, ovalibus vel triangularibus, caeteris hexagono-oblongis, basin versus sensim longioribus, infimis linearibus. Caetera ignota.

Masatierra: Pangal; ad rupem praeruptam in cataracta; 205 m. s. m. (256).

Species praecedenti affinis, sed foliis acumine exciso, nervo crassiore, longe excedente dignoscenda.

Th. assimile Broth. n. sp.

Praecedenti gracilius, atroviride, opacum. Caules secundarii usque ad 8 cm alti, stipitati, stipite 2—5 cm longo, foliis squamaeformibus dense vestito, dein pinnatim ramosi, densiuscule foliosi, complanati, ramis usque ad 6 cm longis, infimis pinnatim ramulosis. Folia erecto-patentia, concaviuscula, lanceolata, raptim in acumen breve, argute serratum contracta, c. 2 mm longa; nervo crassissimo, ubique aequilato, infra summum apicem folii evanido; cellulis haud incrassatis, superioribus ovalibus, caeteris hexagono-oblongis, basilaribus linearibus. Caetera ignota.

Masatierra: Quebrada Damajuana; ad marginem cataractae (350); 250 m. s. m.

Species praecedenti valde affinis, sed foliis in acumen breve, argute serratum contractis dignoscenda.

Th. confertum (Mitt. sub *Porotricho* in Hemsley Challenger Rep. Bot. I.).

Masatierra: Sine loco designato (MOSELEY).

Area: Endemic.

Pinnatella (C. Müll.) Fleisch.

P. (Eupinnatella) **macrosticta** Broth. n. sp. — Plate 27, fig. 14—15.

Tenella, laxe caespitosa, fuscescenti-viridis. Caulis primarius elongatus, repens; caules secundarii vix ultra 5 mm alti, ± distincte pinnatim ramosi, ramis patentibus brevibus, laxiuscule et complanate foliosis, simplicibus, obtusis. Folia patula, breviter oblonga, acumine brevi, acutiusculo terminata, c. 0,75 mm longa et c. 0,2 mm lata, apice minute denticulata; nervo infra apicem folii evanido; cellulis rotundato-hexagonis, papilla media distinctissima instructis, inferioribus sensim longioribus. Caetera ignota.

Masafuera: Quebrada de las Casas; ad corticem (271, 273).

Species distinctissima, foliis cellulis papilla media elevata instructis a congeneribus raptim dignoscenda.

Hookeriaceae.

Distichophyllum Doz. et Molk.

D. (Discophyllum) **subelimbatum** Broth. n. sp. — Plate 27, fig. 9—10.

Dioicum; gracile caespitosum, caespitibus densiusculis, mollibus, depressis, glauco-viridibus, aetate lutescenti-viridibus, opacis. Caulis fragilis, repens, hic illic rhizoideis fuscis instructus, densiuscule et complanate foliosus, cum foliis 2—3 mm latus, ramosus. Folia sicca vix mutata, planiuscula, lateralia patentia, e basi anguste et breviter spathulata obovata, obtusa, mutira vel apiculata, marginibus minutissime crenulatis; nervo tenuissimo, ad vel paulum ultra medium folii evanido; cellulis laminalibus superioribus angulato-rotundatis, 0,015—0,020 mm, dein sensim majoribus, ovali-hexagonis, basilaribus oblongo-hexagonis, marginalibus inferioribus elongatis, angustis, limbum uniseriatum, hyalinum, vix ad medium folii productum efformantibus. Folia intermedia subconformia, media multo minora, ovalia, nervo breviore. Bracteae perichaetii erectae, minutae, e basi oblonga breviter ligulatae, acutae, apice crenulatae, enerves. Seta c. 8 mm alta, tenuis, rubra, laevissima. Calyptra superne scabra, basi pilis longis instructa. Caetera ignota.

Masatierra: In jugo inter valles Piedra agujereada et Laura; ad ligna putrida; 650 m. s. m. (306, 309). Valle Colonial; ad parietes cavernae plus minusve humidas (304, 305, 308, 310, 312, 313, 316, 317). In jugo Centinela; ad truncos Filicum (311). Salsipuedes; ad ligna putrida in Dicksonieto; 660 m. s. m. (314, 315).

Species distinctissima, ob folia subelimbata cum nulla alia commutanda.

D. (Discophyllum) **assimile** Broth. n. sp.

Dioicum? gracilescens, caespitosum, caespitibus densiusculis, mollibus, glauco-viridibus, opacis. Caulis procumbens, inferne fusco-radiculosus, densiuscule et complanate foliosus, cum foliis c. 3 mm latus, ramosus. Folia sicca vix mutata, planiuscula, e basi anguste et breviter spathulata obovata, obtusa, apiculata, limbata, superne minutissime serrulata; nervo tenuissimo, ultra medium folii evanido; cellulis laminalibus superioribus angulato-rotundatis, 0,015—0,020 mm, dein sensim majoribus, ovali-hexagonis, basilaribus oblongo-hexagonis, marginalibus elongatis, angustis, limbum biseriatum, lutescentem, usque ad apicem productum efformantibus. Folia intermedia subconformia, media multo minora, ovalia. Caetera ignota.

Masatierra: Portezuelo; ad ligna putrida in Dicksonieto; c. 550 m. s. m. (307).

Species praecedenti habitu persimilis, sed foliis limbo usque ad apicem producto dignoscenda.

D. (Discophyllum) **fernandezianum** Broth. n. sp. — Plate 27, fig. 7—8.

Gracile, caespitosum, caespitibus densis, mollibus, viridissimis, opacis. Caulis erectus, usque ad 2,5 cm altus, per totam longitudinem parce fusco-radiculosus, dense et vix complanate foliosus, superne dense fasciculatim ramosus. Folia sicca vix mutata, inferiora limbo excepto plerumque destructa, planiuscula, lateralia erecto-patentia, ovalia, raptim in apiculum contracta, c. 1,1 mm longa et c. 0,57 mm lata, limbata, e medio ad apicem serrulata; nervo tenuiusculo, lutescente, ultra medium folii evanido; cellulis laminalibus angulato-rotundatis, 0,007—0,010 mm, basilaribus raptim multo majoribus, oblongo-hexagonis, marginalibus elongatis, angustis, limbum lutescentem, 3 seriatum efformantibus. Folia ventralia et dorsalia minora. Caetera ignota.

Masafuera: In alpinis prope campos »Correspondencia» dictos; ad saxa humida rivuli; 1100 m. s. m. (303).

Species *D. rotundifolio* (Hook. fil. et Wils.) Broth. forsan affinis, sed foliis densius areolatis, latius limbatis jam dignoscenda.

Pterygophyllum Brid.

P. anomalum (Schwaegr.) Mitt.

Masatierra: Pangal; ad marginem cataractae; 205 m. s. m. (290).
Area: Fuegia.

P. obscurum (Mont.) Mitt.

Masafuera: Quebrada Lobería; in rivulo una cum *Philonotide vagante* (291).
Area: Chile, W. Patagonia, Falkland Isl., Tasmania.

P. tenuinerve Broth. n. sp. — Plate 27, fig. 5—6.

Dioicum; gracilescens, caespitosum, caespitibus laxiusculis, mollissimis, sordide glauco-viridibus, opacis. Caulis arcuato-procumbens, vix ultra 1 cm longus, basi fusco-radiculosus, laxe et complanate foliosus, simplex. Folia facillime emollita, sicca vix mutata, planiuscula, lateralia patula, e basi brevissime spathulata oblonga, obtusa, usque ad 4 mm longa et usque ad 1,7 mm lata, e medio ad apicem grosse serrata; nervo tenui, brevi vel brevissimo; cellulis laminalibus valde pellucidis, rotundatis, superioribus 0,05—0,06 mm, basin versus sensim majoribus. Folia ventralia et dorsalia erectiora, minora. Bracteae perichaetii erectae, e basi oblonga anguste lanceolatae, integrae. Seta c. 12 mm alta, tenuis, nigrescens, laevissima. Theca nutans, minuta, breviter oblonga, sicca deoperculata sub ore constricta, atrofusca. Caetera ignota.

Masatierra: Cumberland, Bay, Pico Central; ad ligna putrida; 390 m. s. m. (386 fo. major). Salsipuedes; ad vegetabilia putrescentia in Dicksonieto parce; 660 m. s. m. (330). In jugo inter valles Piedra agujereada et Laura; ad ligna putrida; 650 m. s. m. (287, 288, 289 fo. major).

Species praecedenti valde affinis, sed foliis glauco-viridibus, facillime emollitis, grosse serratis, nervi tenui, brevissimo instructis dignoscenda.

P. denticulatum (Hook. fil. et Wils.) Mitt.

Masatierra: Sine loco designato (E. C. Reed).

Area: Fuegia, Falkland Isl., East Australia, Tasmania, New Zealand, Auckland und Campbell Isl.

Eriopus (Brid.) C. Müll.

E. leptoloma Broth. n. sp. — Plate 27, fig. 1—2.

Autoicus; robustiusculus, caespitosus, caespitibus laxiusculis, laete viridibus, aetate lutescentibus, vernicoso-nitidis. Caulis erectus vel adscendens, 1 cm vel paulum ultra altus, cum foliis usquè ad 5 mm latus, basi fusco-radiculosus, laxiuscule foliosus, simplex. Folia sicca vix mutata, planiuscula, lateralia patentia, paulum asymmetrica, e basi brevissime spathulata ovalia, acuta, limbata, e medio ad apicem serrata; nervo brevissimo, furcato; cellulis ovali-hexagonis, basin versus sensim longioribus, marginalibus elongatis, angustis, limbum 2—3 seriatum efformantibus. Folia ventralia et dorsalia minora. Seta c. 4 mm alta, lutea, mamillis humilibus, latis, hyalinis instructa. Caetera ignota.

Masatierra: V. Colonial, Quebrada Gutierrez; ad ligna putrida silvae; c. 300 m. s. m. (302).

Masafuera: Quebrada del Blindado; ad ligna putrida silvae; c. 440 m. s. m. (301).

Species *E. apiculato* (Hook. fil. et Wils.) Mitt. affinis, sed inflorescentia autoica, foliis acutis nec cuspidatis, argutius serratis, angustius limbatis nec non seta breviore dignoscenda.

E. grandiretis Broth. n. sp. — Plate 27, fig. 3—4.

Robustus, mollis, glaucoviridis, opacus. Caulis usque ad 6 cm altus, cum foliis usque ad 8 mm latus, inferne fusco-radiculosus, densiuscule foliosus, attenuatus, simplex vel parce ramosus. Folia inferiora remota, dein magis conferta, sensim majora, lateralia patentia, oblonga, raptim in acumen breve, acutum attenuata, usque ad 4 mm longa et 1,9 mm lata, marginibus e medio ad apicem argute serratis; nervo e basi fere bifurco, cruribus inaequalibus, longiore ad medium folii evanido; cellulis laxis, valde pellucidis, oblongo- vel ovali-hexagonis, marginalibus angustis, limbum uniseriatum, hyalinum efformantibus. Caetera ignota.

Masafuera: In parte intima faucis Casas; ad truncum (265).

Species pulcherrima, praecedenti affinis, sed statura robustiore foliisque laxe areolatis, limbo uniseriato longe diversa.

Lamprophyllum Schimp.

L. splendidissimum (Mont.) Schimp.

Masatierra: Sine loco designato (BERTERO, MOSELEY). Quebrada Gutierrez; ad ramulos arborum in silva; c. 300 m. s. m. (300). Ad rupes humidas in silva secus viam ad Portezuelo (298). Portezuelo; ad ligna putrescentia Dicksonieti; c. 550 m. s. m. (297 p. p., 299). Salsipuedes; ad truncos *Drimydis* in Dicksonieto; 660 m. s. m. (292, 293). Villagra, Quebrada Choza; ad truncos in silva; c. 250 m. s. m. (295, 298 p. p.).

Masafuera: Quebrada de las Casas; ad rupem praeruptam (294). Quebrada del Blindado; ad truncum; 440 m. s. m. (296).

Area: Chile, W. Patagonia.

Hypopterygiaceae.

Lopidium Hook. fil. et Wils.

L. concinnum (Hook.) Fleisch.

Masatierra: In declivi montis Yunque; ad truncos; c. 450 m. s. m. (331, 333). In jugo inter Quebrada Piedra Agujereada et Quebrada Laura; 650 m. s. m. (332).

Area: Chile, W. Patagonia, Australia, Tasmania, New Zealand, Auckland, Isl.

Hypopterygium Brid.

H. Thouini (Schwaegr.) Mont.

Masafuera: Quebrada de las Casas raro; c. 200 m. s. m. (334).

Area: Chile, W. Patagonia, Fuegia.

Rhacopilaceae.

Rhacopilum Palis.

Rh. fernandezianum Card. in Soc. Havr. p. 7 (1921) (*Rh. fernandezianum* Broth. in sched.).

Dioicum; gracilescens, caespitosum, caespitibus densis, depressis, late extensis, viridibus vel lutescentibus, caulibus intertextis. Caulis elongatus, repens,

per totam longitudinem fusco-tomentosus, dense foliosus, pinnatim ramosus, ramis patulis, simplicibus, vix ultra 5 mm longis, cum foliis c. 2 mm vel paulum ultra latis, singulis longioribus, pinnatim ramulosis. Folia postica siccitate in series duas reflexas, aristatas disposita, madore applanata, ovato-oblonga, obtusiuscula, aristata, apice tantum minute serrulata; nervo in aristam longiusculam, rigidam, subintegram excedente; cellulis laminalibus minutis, angulato-ovalibus vel subrotundis, papilla media minutissima instructis, basilaribus oblongis. Folia antica minora, late cordato-lanceolata, apice minutissime serrulata; nervo in aristam longam, rigidam, subintegram excedente. Seta c. 1,5 cm alta, tenuis, rubra. Theca suberecta vel inclinata, anguste cylindrica, arcuata, c. 5 mm longa, pallida, aetate fusca, sicca plicatula. Operculum e basi convexa longe rostratum. Calyptra parce pilosa.

Masatierra: Sine loco designato (BERTERO). In declivi septemtrionali montis Yunque; ad truncos Filicum; 4—500 m. s. m. (282). Valle de Anson, prope Plazoleta; ad truncos putridos, c. 260 m. s. m. (277, 281, 284). Valle Colonial, Pico Central, ad terram 390 m. s. m. (261); Quebrada Gutierrez, in silva c. 300 m. s. m. (318, 324); Quebrada del Monte Maderugo, ad truncos silvae siccioris (260); Quebrada seca, 435 m. s. m. ad truncos *Myrceugeniae* (278, 321) et ad terram (320); in jugo ad Portezuelo, in Dicksonieto, c. 550 m. s. m. (297 p. p.) et in silva ad arbores et ad terram (262). Quebrada Juanango, ad truncos in rivulo sicco (257, 262). Inter Villagra et Tres Puntas locis humidioribus (323). Quebrada de la Choza, in silva 250 m. s. m. ad terram (263).

Masafuera: inter Sanchez et Toltén; ad truncos putridos in silva, 515 m. s. m. (259, 325). Quebrada del Mono; ad truncos in silva, 475 m. s. m. (280). Quebrada de las Casas; ad rupes praeruptas humidas (274, 326).

Species *Rh. tomentoso* (SW.) Brid. affinis, sed foliis apice minute serrulatis vel subintegris, cellulis laminalibus minoribus nec non theca anguste cylindrica dignoscenda.

Some expressions in CARDOT's diagnose led me to the conclusion that his species was different from that collected by SKOTTSBERG, but the examination of type material removed all doubts as to their identity. The briefness of CARDOT's description justifies the more detailed one given above.

Area: Endemic.

Thuidiaceae.

Thuidium Bryol. eur.

Th. (Thuidiopsis) **Masafuerae** Broth. n. sp.

Dioicum. Robustiusculum, caespitosum, caespitibus laxis, lutescentibus. Caulis elongatus, procumbens, flexuosus, parce radiculosus, laxe bipinnatim ramosus, ramis patulis, ad 1,5 cm longis, arcuatulis, attenuatis, ramulis subremotis, brevibus. Folia caulina arcuato-patula, plicata, e basi late cordata raptim lanceolato-subulata, c. 1,1 mm longa et c. 0,75 mm lata, marginibus basi recurvis,

apice minutissime serrulatis; nervo valido, infra apicem folii evanido; cellulis subrotundis 0,010—0,012 mm, papilla media instructis, subpellucidis. Folia ramea brevius acuminata, ramulina ovato-lanceolata, obscura. Caetera ignota.

Masafuera: Cordón del Barril, in filiceto (513).

Species *Th. fulvastro* (Mitt.) Jaeg. affinis, sed caule laxe bipinnatim ramoso oculo nudo jam dignoscenda.

Th. Valdiviae Broth. in Herb.

Dioicum. Gracilescens, caespitosum, caespitibus densis, extensis, viridibus, aetate lutescentibus. Caulis elongatus, arcuato-procumbens, interrupte fusco-radiculosus, dense bipinnatim ramosus, ramis suberectis, vix ultra 1 cm longis, strictis vel arcuatulis, ramulis brevissimis. Folia caulina arcuato-patula, plicata, e basi late cordata raptim lanceolato-subulata, c. 0,8 mm longa et c. 0,65 mm lata, marginibus basi recurvis, subintegris; nervo valido; infra apicem folii evanido; cellulis angulato-rotundatis, 0,007—0,010 mm, papilla media instructis, subpellucidis. Folia ramea angustiora, brevius acuminata, ramulina ovata, acuta, cellulis obscuris. Bracteae perichaetii erectae, piliformiter attenuatae, basi ciliis elongatis instructae. Caetera ignota.

Masatierra: Quebrada Damajuana, in declivi silvatico, c. 200 m. s. m. (514, 515).

Masafuera: Quebrada de las Casas.

Species a praecedente statura graciliore, caule dense bipinnatim ramoso, foliis caulinis subintegris, densius areolatis dignoscenda.

Area: Chile, Valdivia (A. HOFMANN in herb. BROTH.).

Amblystegiaceae.

Sciaromium Mitt.

S. pachyloma (Mont.) Par.

Masatierra: Pangal; in cataracta; 205 m. s. m. (239). Quebrada Juanango; in aqua fluitante (238). Cerro Chumacera; ad rupes praeruptas irroratas (237).

Masafuera: Quebrada de las Casas; in aqua fluitante. Quebrada de la Lobería, in cataracta (235).

Area: Chile.

Hypnaceae.

Hypnum Dill. emend.

H. Lechleri C. Müll.

Masatierra: Sine loco designato (BERTERO, MOSELEY); Puerto Frances, c. 500 m. s. m. (399). In jugo inter Quebrada Piedra agujereada et Quebrada

Laura; 650 m. s. m. (392, 398). Cordón Centinela; 530 m. s. m. (453, 457). Quebrada Damajuana (459). Cerro Damajuana (458). El Yunque, in declivi septemtrionali; 4—500 m. s. m. (391). Portezuelo de Villagra; c. 500 m. s. m. (394, 455) et c. 550 m. s. m. (456). Quebrada Gutierrez (490). Quebrada seca; 435 m. s. m. (393, 396, 397). Cordón Salsipuedes; c. 600 m. s. m. (395). Puerto Ingles; c. 575 m. s. m. (474). Quebrada de la Choza; c. 250 m. s. m. (452). — Ubique ad truncos et ad ligna putrida.

Area: Chile, Patagonia.

Isopterygium Mitt.

I. fernandezianum Broth. n. sp.

Autoicum; gracilescens, caespitosum, caespitibus densiusculis, depressis, laete viridibus, sericeo-nitidis. Caulis repens, per totam longitudinem fusco-radiculosus, dense et complanate foliosus, vage ramosus, ramis brevibus, complanatis, cum foliis c. 1,5 mm latis, simplicibus, obtusis. Folia falcatula, concaviuscula, caulina ovato-lanceolata, in acumen ± elongatum, subpiliforme sensim attenuata, marginibus erectis, integris; enervia; cellulis anguste linearibus, basilaribus infimis laxis, oblongis, hyalinis vel aureis, alaribus haud diversis. Folia ramea brevius acuminata, superne ± distincte serrulata. Bracteae perichaetii internae erectae, subsensim in acumen elongatum, lanceolato-subulatum, serrulatum attenuatae. Seta c. 5 mm alta vel paulum ultra, tenuis, rubra. Theca horizontalis vel subnutans, ovalis, regularis, sicca sub ore paulum constricta, fusca.

Masatierra: In jugo Centinela; ad ligna putrida; 530 m. s. m. (479).

var. **longisetum** Broth. n. var.

Seta 1—1,5 cm alta.

Masatierra: Cordón Centinela; 530 m, s. m. (485). Valle Anson prope Plazoleta; 260 m. s. m. (491). Cumberland Bay, Pico Central; 390 m. s. m. (492). Valle Colonial, Quebrada seca; 435 m. s. m. (481, 484, 487). Cerro Pirámide; c. 600 m. s. m. (488). Cordón Salsipuedes; in *Dicksonieto;* 660 m. s. m. (480, 483). El Yunque; 4—500 m. s. m. (482). Villagra, Quebrada de la Choza; c. 250 m. s. m. (486). Ubique ad ligna putrida.

Species ob folia cellulis infimis laxis instructa cum *I. tenero* (Sw.) Mitt. comparanda, sed statura robustiore jam dignoscenda.

Sematophyllaceae.

Rhapidostegium (Bryol. eur.) De Not.

Rh. (Cupressinopsis) **Masafuerae** Broth. n. sp.

Autoicum; robustiusculum, caespitosum, caespitibus densis, mollibus, viridibus vel lutescenti-viridibus, sericeo-nitidis. Caulis elongatus, repens, dense

ramosus, ramis usque ad 6 cm longis, adscendentibus, dense foliosis, dense ramulosis, ramulis vix ultra 1 cm longis, sursum spectantibus. Folia falcata, concava, oblongo-lanceolata, sensim in subulam ± elongatam, serrulatam attenuata; enervia; cellulis angustissime linearibus, basilaribus infimis brevioribus, aureis, alaribus magnis, oblongis, vesiculosis, aureis. Bracteae perichaetii internae vaginantes, in acumen breve lanceolatum, serrulatum attenuatae. Seta 1 cm vel paulum ultra alta, tenuis, rubra, laevis. Theca suberecta, turgide ovalis, fusca. Caetera ignota.

Masafuera: Correspondencia; 1150 m. s. m. (499).

Species pulchra, habitu *Rh. cyparissoidi* (Hornsch.) Besch. similis, sed foliis superne serrulatis nec non seta brevi jam dignoscenda.

Rh. (Cupressinopsis) **aberrans** Broth. n. sp.

Autoicum; gracile, caespitosum, caespitibus densiusculis, depressis, viridibus vel lutescenti-viridibus, nitidis. Caulis repens, per totam longitudinem radiculosus, dense et complanate foliosus, pinnatim ramosus, ramis brevibus, patentibus, complanatis, simplicibus, obtusis. Folia patentia, ± distincte subsecunda, concava, lanceolata vel oblongo-lanceolata, sensim ± longe subulata, marginibus erectis, subintegris vel superne minutissime serrulatis; enervia; cellulis angustissime linearibus, infimis aureis, alaribus oblongis, vesiculosis, aureis, omnibus laevissimis. Bracteae perichaetii erectae, internae raptim in acumen breve, serrulatum attenuatae. Seta c. 1 cm alta, tenuis, rubra, laevissima. Theca horizontalis vel subnutans, minuta, ovalis, sicca sub ore paulum constricta, fuscidula. Operculum longe rostratum.

Masatierra: In jugo Centinela; 530 m. s. m. (385, 389). Plazoleta in valle Anson; c. 260 m. s. m. (379). Quebrada del Monte Maderugo (377). Salsipuedes, in Dicksonieto; 660 m. s. m. (386 p. p.). Quebrada Gutierrez; in silva; c. 300 m. s. m. (387). Quebrada Juanango; c. 250 m. s. m. (383, 384). Ubique ad ligna putrida.

Masafuera: Quebrada del Mono; ad truncos arborum (388). In valle Mono; ad truncum *Dicksoniae* (378). Quebrada del Blindado; 400—440 m. s. m. (489, 500). In silva inter Sanchez et Toltén; ad ligna putrida; 515 m. s. m. (390). Cordón Barril (498).

Species *Rh. callido* (Mont.) Jaeg. foliorum forma affinis, sed caule complanato foliisque ± distincte subsecundis nec falcatis oculo nudo jam dignoscenda.

Rh. caespitosum (Sw.) Jaeg.

Masatierra: Cordón Escarpado, El Pico; ad moles humidiusculos; 365 m. s. m. (497). Quebrada Juanango; ad arbores (370).

Masafuera: Quebrada de la Loberia; ad arbores; 280 m. s. m. (496).

Area: Antilles, Trinidad, tropical and subtropical parts of South America.

Rh. (Aptychus) **caespitosoides** Broth. n. sp.

Autoicum; gracilescens, caespitosum, caespitibus densiusculis, late extensis, lutescenti-viridibus, nitidis. Caulis elongatus, repens, per totam longitudinem hic illic fusco-radiculosus, dense foliosus, dense ramosus, ramis brevibus. Folia sicca laxe imbricata, humida erecto-patentia, concava, oblongo-elliptica, sensim lanceolato-acuminata, c. 1,7 mm longa et c. 0,5 mm lata, marginibus erectis, integerrimis; enervia; cellulis angustissimis, haud incrassatis, infimis aureis, alaribus oblongis, versiculosis, aureis vel hyalinis. Bracteae perichaetii erectae, acumine brevi, serrulato. Seta usque ad 1,5 cm alta, tenuis, rubra. Theca horizontalis, e collo distincto ovalis, sicca deoperculata sub ore parum constricta, pallida. Operculum longe subulatum.

Masafuera: Quebrada de las Casas; ad truncos in rivulo; c. 200 m. s. m. (493). Ibidem ad saxa (371). Ibidem ad saxa rivuli (494, 495).

Species praecedenti similis, sed bracteis perichaetii acumine brevi instructis dignoscenda.

Rh. (Aptychus) **brachycladulum** Broth. n. sp.

Autoicum; gracilescens, caespitosum, caespitibus densiusculis, laete viridibus, aetate fuscescenti-viridibus, sericeo-nitidis. Caulis elongatus, repens, per totam longitudinem fusco-radiculosus, dense foliosus, densissime ramosus, ramis brevissimis, erectis, simplicibus, obtusis. Folia erecto-patentia, concava, oblongo-elliptica, lanceolato-acuminata c. 1,5 mm longa et usque ad 0,6 mm lata, marginibus erectis, integerrimis; enervia; cellulis angustissimis, haud incrassatis, infimis aureis, alaribus oblongis, vesiculosis, plerumque hyalinis. Bracteae perichaetii erectae, sensim lanceolato-subulatae, integrae. Seta vix ultra 5 mm alta, tenuissima, rubra, laevissima. Theca suberecta vel inclinata, regularis, oblonga, sicca deoperculata sub ore constricta, fuscidula. Operculum longe rostratum.

Masatierra: Valle Colonial, Quebrada seca; ad truncum *Coprosmatis trifiori;* 435 m. s. m. (369). Yunque ad truncum (368).

Rigodium Kunz.; Schwaegr.

R. toxarion (Schwaegr.) Schimp.

Masatierra: Sine loco designato (BERTERO, DOUGLAS, E. C. REED); Puerto Frances; ad basin truncorum; c. 500 m. s. m. (412, 416, 419). In jugo inter Quebrada Laura et Quebrada Piedra Agujereada; c. 600 m. s. m. (415) et 650 m. s. m. (406). Quebrada de la Damajuana; in silva (374, 413, 428). El Yunque; 4—500 m. s. m. (431, 436, 438). Cumberland Bay, Pico Central; 390 m. s. m. (421). Valle Colonial, Quebrada seca; ad basin truncorum; 435 m. s. m. (400, 408, 437, 441). Cerro Pirámide; c. 600 m. s. m. (407, 411). Portezuelo; c. 600 m. s. m. (430) et c. 550 m. (417). Infra Portezuelo de Villagra; ad ligna putrida; c. 500 m. s. m. (460). Quebrada Gutierrez; in silva; c. 300

m. s. m. (410). Cordón Salsipuedes: 615 m. s. m. (401, 405); in Dicksonieto; 660 m. s. m. (420); in silva lapidosa; 625 m. s. m. (427); in fruticetis; 615 m. s. m. (462). Quebrada Juanango; ad cataractam (403) et ad terram; c. 250 m. s. m. (422). In trajectu Villagra; ad rupem praeruptam; c. 600 m. s. m. (414). Quebrada de la Choza; ad truncos; c. 250 m. s. m. (298, 402, 461, 482).

Masafuera: Quebrada del Mono; in silva (439, 443). Quebrada del Blindado; ad terram et lapides; 440 m. s. m. (442). In jugo supra Varadero; ad truncos in Dicksonieto; 8—900 m. s. m. (409). Quebrada de la Lobería; ad terram et lapides silvae; 280 m. s. m. (440).

Area: Tropical and subtropical parts of South America, Patagonia.

R. arborescens (C. Müll.) Broth.

Masatierra: Ad rupem praeruptam infra Portezuelo; c. 500 m. s. m. (424, 426). Salsipuedes; in silva jugi (425).

Masafuera: Quebrada del Mono; in silva (463). Quebrada de las Casas; ad moles sat frequenter (464, 465). Ad terram inter Sanchez et Toltén; 515 m. s. m. (423).

Area: Chile.

R. hylocomioides Card. et Broth.

Masafuera: Correspondencia; c. 1100 m. s. m. (466).

Area: Patagonia.

R. robustum Broth. n. sp

Dioicum; robustum, caespitosum, caespitibus laxis, rigidis, fuscescentibus, vix nitidiusculis. Caulis elongatus, repens, nudus, divisionibus usque ad 5 cm longis, inferne simplicibus, dein bipinnatim ramosis, ramis vix ultra 2 cm longis, arcuatulis, attenuatis vel obtusis. Folia caulina subsquarrosa, late cordato-ovata, raptim in acumen lanceolato-subulatum attenuata, c. 1,5 mm longa et c. 0,8 mm lata, marginibus basi recurvis, integris vel acumine minutissime serrulatis; nervo in acumine evanido; cellulis incrassatis, lumine angusto. Folia ramea erectiora, minora, ovato-lanceolata, superne minutissime serrulata. Caetera ignota.

Masatierra: Salsipuedes; in silva lapidosa jugi; 625 m. s. m. (429).

Species a congeneribus statura multo robustiore oculo nudo jam dignoscenda.

Rhynchostegium Bryol. eur.

Rh. complanum (Mitt.) Jaeg.

Masatierra: Quebrada de la Damajuana; in silva (432, 435). Ad rupem praeruptam infra Portezuelo; c. 500 m. s. m. (433). In jugo Portezuelo; in silva; c. 550 m. s. m. (434).

Masafuera: Quebrada del Blindado; ad truncos; 440 m. s. m. (506).
Area: Chile.

Rh. tenuifolium (Hedw.) Jaeg.

Masatierra: Sine loco designato (E. C. REED).
Area: Uruguay, Chile, East Australia, Tasmania, New Zealand.

Catagoniopsis Broth.

C. Berteroana (Mont.) Broth.

Masatierra: Sine loco designato (MOSELEY).
Area: Chile.

Hypnodendraceae.

Hypnodendron Lindb.

H. microstictum Mitt.

Masafuera: Quebrada del Mono; in silva (267 p. p.). Cerro Correspondencia; c. 1100 m. (340).
Area: Chile.

Polytrichaceae.

Oligotrichum Lam. et DC.

O. canaliculatum (Hook.) Mitt. var. **minus** Broth. n. var.

A typo foliis brevioribus, seta vix ultra 1 cm alta nec non theca multo minore differt.

Masafuera: Ad rupes terra obtectas inter Casas et Chozas; c. 450 m. s. m. (467, 468).
Area of *O. canaliculatum* typicum: Chile.

Psilopilum Brid.

P. antarcticum C. Müll.

Masafuera: Las Torres; ad rupes; 1370 m. s. m. (469).
Area: Fuegia, Kerguelen, South Georgia.

Polytrichadelphus (C. Müll.) Mitt.

P. magellanicus (L.) Mitt.

Masafuera: Correspondencia; in campo; 11—1300 m. s. m. (470, 471) et c. 1400 m. s. m. (472).

Area: Patagonia, Fuegia, Falkland Isl., Tasmania, New Zealand, Auckland and Campbell Isl.

Dendroligotrichum (C. Müll.) Broth.

D. dendroides (Brid.) Broth.

Masafuera: Correspondencia (473); c. 1100 m. s. m. (474) et 1150 m. s. m. (475). Quebrada de las Casas; c. 200 m. s. m. (476).

Area: Peru, Chile, Patagonia, New Zealand.

As JOHOW's book on the Botany of Juan Fernandez has long been the principal source of information regarding these islands and will, it is assumed, continue to be consulted, I have found it useful to copy his list of mosses and add the name for each species as used in my list. In several cases an identification, for want of original specimens from the islands, has not been possible.

Racopilum tomentosum Brid. Probably the same as Rh. fernandezianum Card.
Stereodon Lechleri (C. Müll.) Mitt. = Hypnum Lechleri C. Müll.
Hypnum circinale Hook. =?
Hypnum tenuifolium Hedw. = Rhynchostegium tenuifolium (Hedw.) Jaeg.
Hypnum neckeroides Hook. =?
Hypnum Berteroanum Mont. = Catagoniopsis Berteroana (Mont.) Broth.
Hypnum serrulatum Hedw. =?
Hypnum aciculare Brid. Probably the same as Ptychomnium subaciculare Besch.
Hypnum toxarion Schwaegr. = Rigodium toxarion (Schwaegr.) Schimp.
Hypnum crassiusculum Schwägr. =?
Leskia mollis Hedw. = Weymouthia mollis (Hedw.) Broth.
Leptodon Smithii Mohr. = L. Smithii (Dicks.) Mohr.
Lepidopilum splendidissimum Mitt. = Lamprophyllum splendidissimum (Mont.) Schimp.
Pterygophyllum denticulatum Mitt. = P. denticulatum (Hk. f. et Wils.) Mitt.
Porotrichum confertum Mitt. = Thamnium confertum (Mitt.).
Porotrichum latinerve Mitt. = Thamnium latinerve (Mitt.).
Porotrichum rigidum Mitt. = Thamnium rigidum (Mitt.) Broth.
Lepyrodon parvulus Mitt. = L. parvulus Mitt.

Fissidens asplenioides Hedw. = F. asplenioides (Sw.) Hedw.
Mielichhoferia longiseta C. Müll. = M. longiseta C. Müll.
Bartramia stricta Brid. =?
Funaria hygrometrica Hedw. = F. hygrometrica (L.) Hedw.
Macromitrium urceolatum Brid. =?
Macromitrium fimbriatum Schwaegr. =?
Macromitrium saxatile Mitt. = M. saxatile Mitt.
Glyphomitrium fernandezianum Mitt. = Ptychomitrium fernandezianum (Mitt.).
Notarisia crispata Mont. =?
Oncophorus cyathicarpus Mitt. = Amphidium cyathicarpum (Mont.) Broth.
Oncophorus striatus Mitt. =?
Zygodon obovalis Mitt. = Z. obovalis Mitt.
Tortula flagellaris Mont. = T. flagellaris (Schimp.) Mont.
Trichostomum longifolium Brid. =?
Campylopus introflexus Brid. = C. introflexus (Hedw.) Brid.
Campylopus leptodus Mitt. = Thysanomitrium leptodus (Mitt.).
Dicranum Billardieri Schwägr. = Dicranoloma Billardieri (Schwaegr.) Par.
Phascum nervosum Hook. = Pleuridium Robinsonii (Mont.) Mitt.

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Explanation of Plates.

Plate 26.

1—4. *Fissidens fernandezianus* Broth.: *1—2* sterile plant ($^{1}/_{1}$, $^{10}/_{1}$); *3* leaf ($^{25}/_{1}$); *4* apex of leaf ($^{150}/_{1}$).

5—8. *Fissidens crassicuspes* Broth.: *5—6* sterile plant ($^{1}/_{1}$, $^{10}/_{1}$); *7* leaf ($^{25}/_{1}$); *8* apex of leaf ($^{150}/_{1}$).

9—12. *Fissidens pycnotylus* Broth.: *9—10* sterile plant ($^{1}/_{1}$, $^{10}/_{1}$); *11* leaf ($^{25}/_{1}$); *12* apex of leaf ($^{150}/_{1}$).

13—15. *Leptodontium fernandezianum* Broth.: *13* sterile plant ($^{1}/_{1}$); *14* leaf ($^{12}/_{1}$); *15* apex of leaf ($^{150}/_{1}$).

16—20. *Didymodon calymperidictyon* Broth.: *16—17* sterile plant ($^{1}/_{1}$, $^{10}/_{1}$); *18* leaves ($^{25}/_{1}$); *19* apex of leaf ($^{150}/_{1}$); *20* base of leaf ($^{150}/_{1}$).

21—24. *Grimmia phyllorhizans* Broth.: *21* fertile plant ($^{1}/_{1}$); *22* leaf ($^{12}/_{1}$); *23* apex of leaf ($^{150}/_{1}$); *24* base of leaf ($^{150}/_{1}$).

25—28. *Macromitrium fernandezianum* Broth.: *25* fertile plant ($^{1}/_{1}$); *26* leaves ($^{25}/_{1}$); *27* apex of leaf ($^{170}/_{1}$); *28* base of leaf ($^{170}/_{1}$).

29—32. *Macromitrium Masafuerae* Broth.: *29* sterile plant ($^{1}/_{1}$); *30* leaves ($^{25}/_{1}$) *31* apex of leaf ($^{170}/_{1}$); *32* base of leaf ($^{170}/_{1}$).

33—35. *Ptychomnium falcatulum* Broth.: *33* fertile plant ($^{1}/_{1}$); *34* leaf ($^{25}/_{1}$); *35* apex of leaf ($^{150}/_{1}$).

Plate 27.

1—2. *Eriopus leptoloma* Broth.; *1* leaves ($^{25}/_{1}$); *2* apex of leaf ($^{65}/_{1}$).

3—4. *Eriopus grandiretis* Broth.: *3* leaves ($^{25}/_{1}$); *4* apex of leaf ($^{65}/_{1}$).

5—6. *Pterygophyllum tenuinerve* Broth.: *5* leaf ($^{25}/_{1}$); *6* apex of leaf ($^{65}/_{1}$).

7—8. *Distichophyllum fernandezianum* Broth.: *7* leaves ($^{25}/_{1}$); *8* apex of leaf ($^{150}/_{1}$).

9—10. *Distichophyllum subelimbatum* Broth.: *9* leaves ($^{25}/_{1}$); *10* apex of leaf ($^{150}/_{1}$).

11—13. *Neckera rotundata* Broth.: *11* sterile plant ($^{1}/_{1}$); *12* leaf ($^{25}/_{1}$); *13* apex of leaf ($^{150}/_{1}$).

14—15. *Pinnatella macrosticta* Broth.: *14* leaves ($^{25}/_{1}$); *15* apex of leaf ($^{150}/_{1}$).

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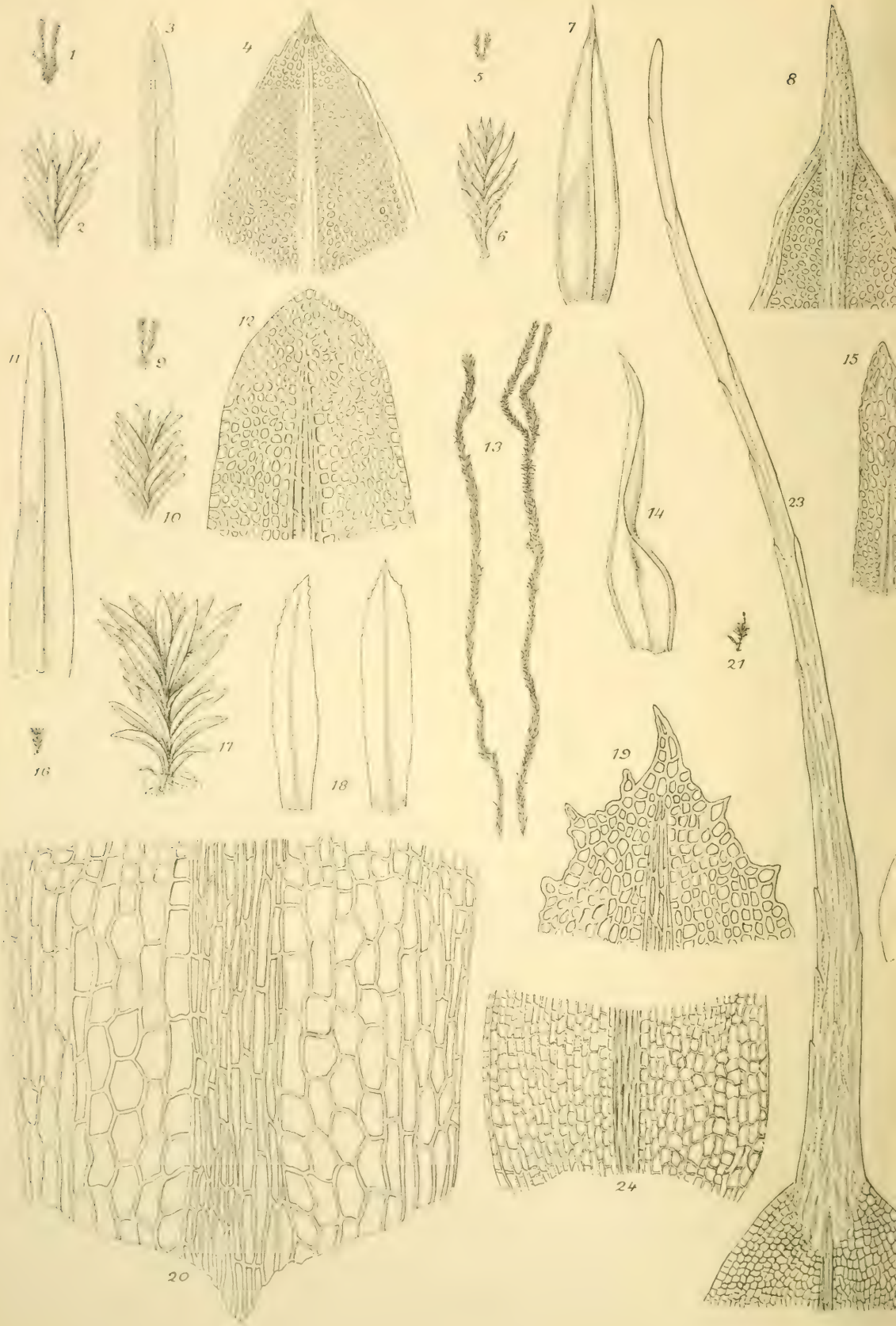
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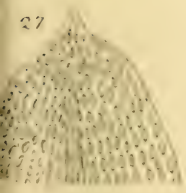
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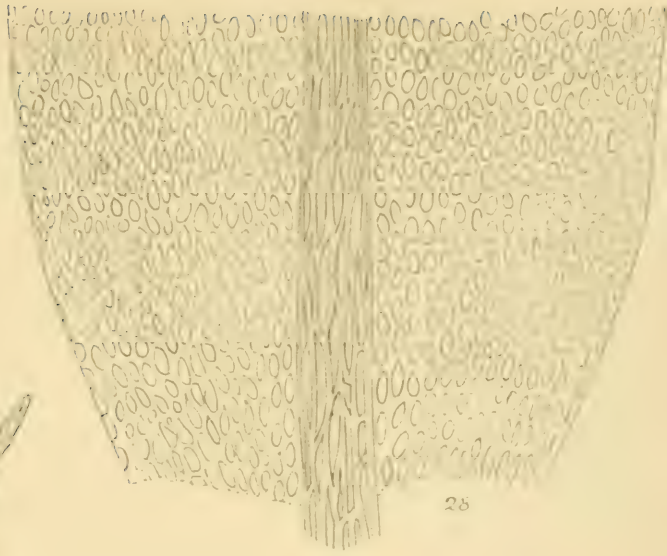
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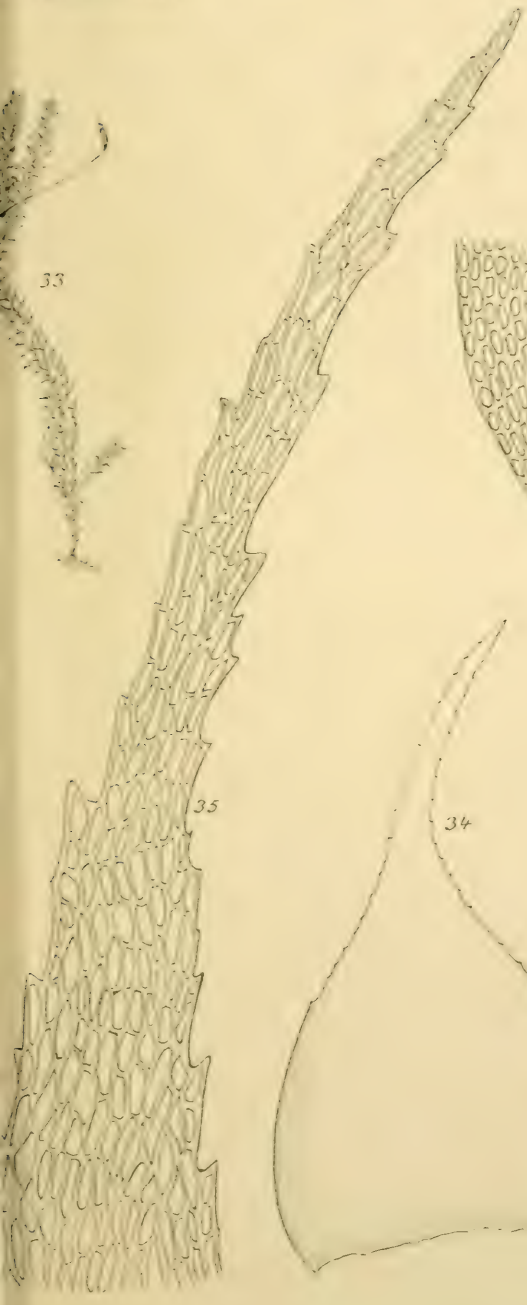
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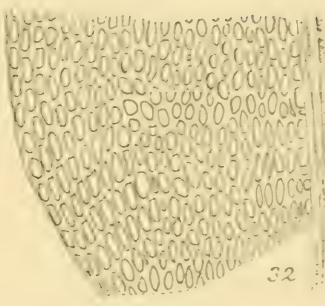
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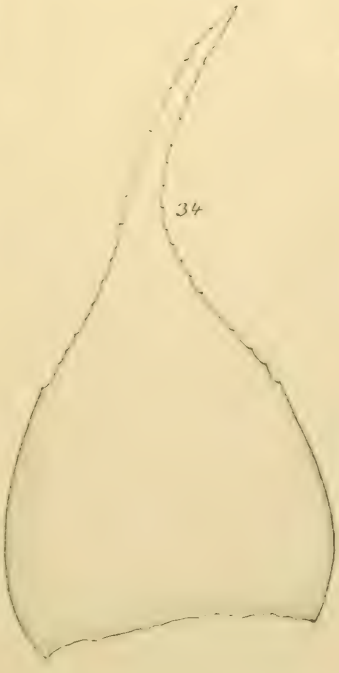
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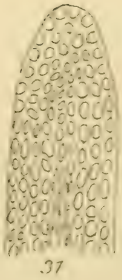
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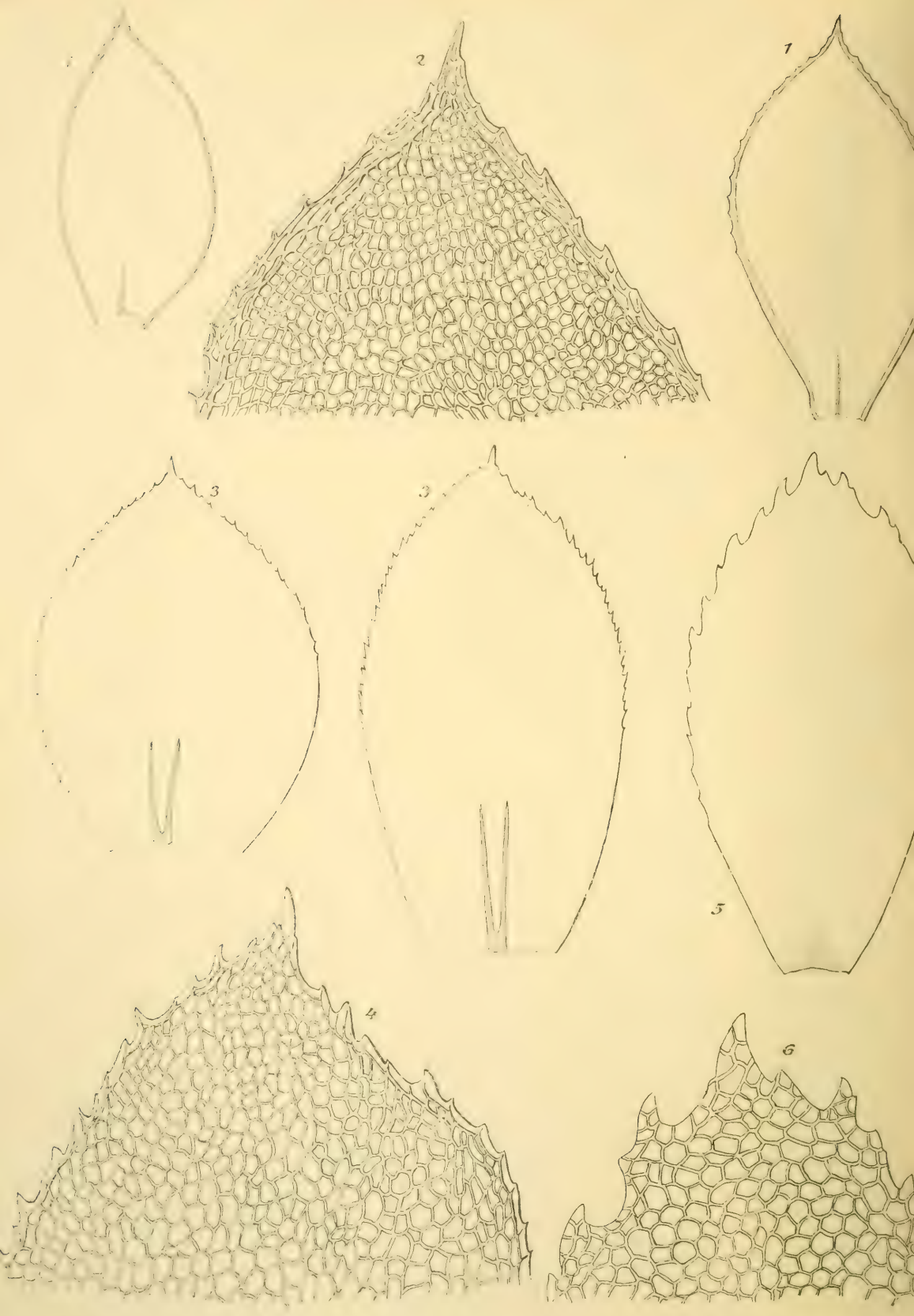
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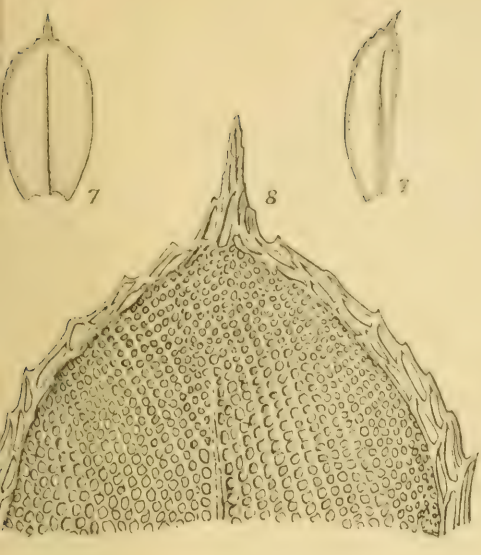

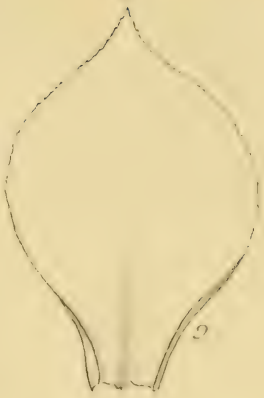

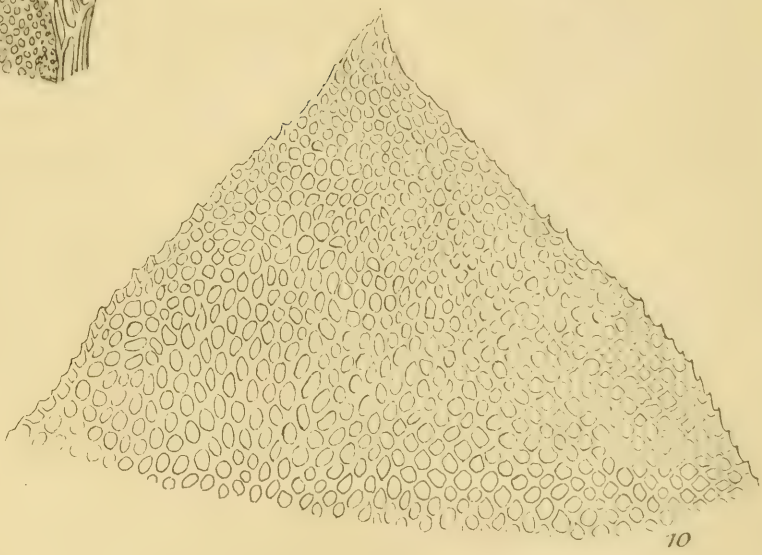

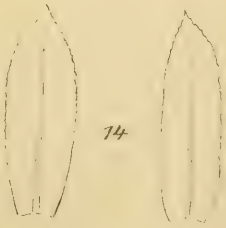

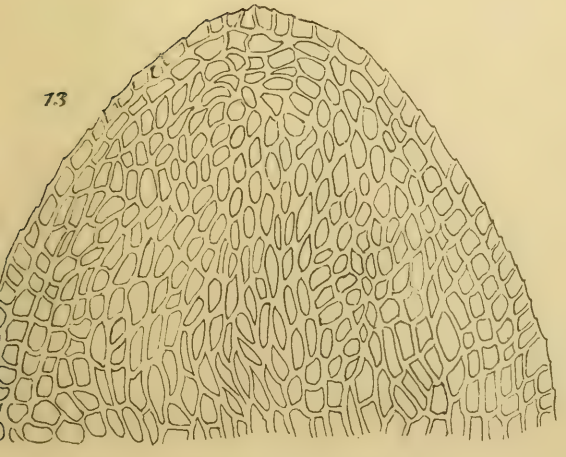

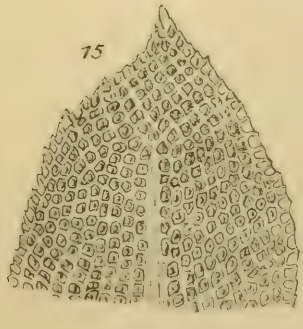

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